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COMPLIMENTS OF

COMMISSION ON COLD STORAGE

F. SPENCER BALDWIN, SECRETARY

House No. 1733

The Commonwealth of Massachusetts.

REPORT

OF THE

COMMISSION TO INVESTIGATE THE SUBJECT

OF THE

COLD STORAGE OF FOOD

AND OF

FOOD PRODUCTS KEPT IN COLD STORAGE.

JANUARY, 1912.

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The Commonwealth of Massachusetts.

BOSTON, Jan. 10, 1912.

To the General Court of Massachusetts.

In accordance with the provisions of chapter 121 of the Resolves of 1911, entitled "Resolve relative to an investigation of the subject of the cold storage of food and food products," we have the honor to transmit the following report.

MEMBERS OF THE COMMISSION.

ARTHUR L. NASON, *Chairman.*
F. SPENCER BALDWIN, *Secretary.*
GEORGE F. MEAD.
FRANCIS BATCHELDER.
DAVID W. MURRAY.

RESOLVE PROVIDING FOR THE APPOINTMENT OF THE COMMISSION.

Chapter 121, Resolves of 1911.

RESOLVE RELATIVE TO AN INVESTIGATION OF THE SUBJECT OF THE COLD STORAGE OF FOOD AND FOOD PRODUCTS.

Resolved, That the governor, with the advice and consent of the council, shall, within thirty days after the passage of this resolve, appoint a commission of five persons, citizens of the commonwealth, to investigate the subject of the cold storage of food and of food products kept in cold storage. The members of the commission shall receive such compensation and may incur such expenses in the performance of their duties as may be authorized by the governor and council; and the commission shall report to the general court on or before the second Wednesday in January in the year nineteen hundred and twelve. The provisions of section twenty-one of chapter three of the Revised Laws shall not apply to appointments made hereunder. [*Approved July 12, 1911.*

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REPORT OF THE COMMISSION.

INTRODUCTORY STATEMENT.

This commission was created by chapter 121 of the Resolves of 1911, approved July 12, 1911. The members of the commission were appointed by the Governor on August 16, 1911, and the appointments were confirmed by the Council, under suspension of the rules, on the same day. The commission was instructed by the resolve "to investigate the subject of the cold storage of food and of food products kept in cold storage," and to report to the General Court on or before the second Wednesday in January in the year 1912. It was further provided in the resolve that the members of the commission should receive such compensation and might incur such expenses in the performance of their duties as might be authorized by the Governor and Council. Later, under chapter 749 of the Resolves of 1911, a sum not exceeding $2,500 was appropriated for the expenses of the commission.

In view of the limited appropriation placed at the disposal of the commission, and the comparatively short time allowed for the completion of its work, it seemed advisable to confine the investigation to the operations of public cold-storage warehouses. The intention of the Legislature in providing for the investigation was presumably to secure definite information with respect to the business of cold storage conducted by such warehouses as a basis for determining the need of legislation for the regulation of this business. Three of the four laws relating to cold storage enacted in 1911, namely, the New York, New Jersey and

Delaware acts, apply only to persons or corporations engaged in the business of cold-storage warehousemen, or in the business of refrigerating; the Indiana cold-storage act alone applies to all cold-storage or refrigerating warehouses, whether for public or for private use. Under the circumstances, the commission decided to restrict the scope of its inquiry to the business of public cold-storage plants. It has not attempted to cover the operations of private refrigerating plants maintained by meat packing establishments, stores or hotels, and offers in this report no findings with respect to this class of warehouses.

The commission has inspected cold-storage establishments in Boston, Worcester and Gloucester. Members of the commission have visited New York and New Jersey, to make a study of the working of the cold-storage laws recently enacted in those States, and to inspect public cold-storage plants, with a view to comparing the conditions found in them with the conditions existing in Massachusetts plants. They have also visited Washington for the purpose of conference with the members of the United States Senate Committee on Manufactures, which has had under consideration during the last two sessions of Congress a bill for the regulation of cold storage. They have also conferred with various officials of the United States Department of Agriculture with reference to the investigations on the subject of cold-storage conducted by that department.

In the preparation of this report the secretary of the commission has made use of all accessible material, reports and documents bearing on the subject of the investigation, especially the reports of the extended hearings before the United States Senate Committee on Manufactures in 1910 and 1911. Information has also been collected, through correspondence, relating to investigation and legislation on the subject of cold storage in other States.

The commission has given four public hearings, at which opportunity has been offered to all persons interested in the matters under consideration to express their views. At these hearings testimony was offered by representatives of the cold-storage warehouse companies, the Boston Fruit and Produce Exchange, and other interests. The commission has, furthermore, consulted, through correspondence, officials of the health departments in American States, with respect to the need of legislation for the regulation of cold storage and the form which such legislation, if needed, should take. The results of these and other special inquiries instituted by the commission are presented in this report.

In the first section of the report that follows, the nature and function of cold storage, its origin and development, and the present extent and organization of the business in Massachusetts are described. In the second section, the influence of cold storage on health and its effect on prices are discussed in detail. In the third section, the legislation enacted in other States and the bills proposed in Massachusetts are outlined. In the fourth section, the various proposals for the regulation of cold storage, including inspection, time limit, marking of cold-storage goods and regulation of their retail sale, are considered, and the findings of the commission with respect to the adoption of such proposals in this State are presented. In the final section, the conclusions and recommendations of the commission are summarized. The appendix contains a draft of a bill for the regulation of cold storage, submitted by this commission for the consideration of the General Court, and miscellaneous matter supplementary to the discussions in the body of the report.

I.

I. NATURE AND FUNCTION OF COLD STORAGE.

Cold storage is a highly important factor in the present system of distributing the food supply in this country. Indeed, the services rendered by this agency are so great that cold storage must be regarded as practically indispensable to the general well-being. Its function is twofold. In the first place, cold storage helps to get perishable food products to the consumer without harmful exposure to heat and consequent deterioration of quality; that is, it preserves goods in transit to the market to meet the current demand. In the second place, it preserves the surplus of the season of abundant production, when the natural supply is in excess of the demand, for later use in the season of scarcity, when the demand is greater than the natural supply; that is, it preserves goods through the interval between flush seasons.

Dr. Harvey W. Wiley has stated this twofold function of cold storage as follows: —

> Storage is a legitimate exercise of the activities of the food distribution when it is practised for the purpose of bringing a fresh article to the market in the best possible condition. The marketing of fresh vegetables, of fish, of milk, of butter, of eggs, of poultry, etc., affords illustrations of the proper exercise of storage in order to secure the delivery of the goods, especially in warm weather, in a suitable condition for consumption. . . . Again, there are certain periods of the year at which certain food products are produced in greatest abundance, and at these periods the production is larger by far than the immediate demand. The application of cold in such cases may carry over a portion of these products in a perfectly legitimate way for the benefit of the consumer at those periods of the year when the production of the article ceases altogether or is diminished. The exercise of cold storage in these cases seems to

me justifiable, provided the period of detention is not so great as to cause appreciable deterioration, as is pointed out in the scientific data of our investigations hereto attached.[1]

The uses of cold storage have been described more in detail by the author of a practical treatise on the subject, Mr. Madison Cooper, in these words: —

> Refrigeration has four chief uses in the economy of nature and in commerce: —
>
> 1. To prevent premature decay of perishable products.
> 2. To lengthen the period of consumption and thus greatly increase production.
> 3. To enable the owner to market his product at will.
> 4. To make possible transportation in good condition from point of production to point of consumption, irrespective of distance.
>
> *First.* — Without refrigeration there would be much actual waste from decomposition before it would be possible to place perishable food products in the possession of the consumers. The immense fruit trade of the Pacific coast would never have been developed without the assistance of refrigeration, nor could the surplus meat products of the southern hemisphere have been brought half way around the globe to relieve the shortage in thickly settled England without its aid. Without the aid of refrigeration to create a constant market, the production of meats, of eggs, of fruits and other food products would be greatly curtailed.
>
> *Second.* — In many classes of product the ordinary season of consumption was formerly limited to the immediate period of production, or but briefly beyond. Now, nearly all fruits may be purchased at any season of the year, and dairy and other products are for sale in good condition and at reasonable prices the year round.
>
> *Third.* — Instead of being obliged to sell perishable goods when produced or purchased, at any price obtainable, the owner can now put away in cold storage a portion or all of his products, to await a suitable time for selling. This not only results in a better average price to the producer, but places perishable foodstuffs at the command of the consumer at a reasonable price at all times, and greatly extends the period of profitable trading in such products.

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[1] "Use of Cold Storage," Senate Document, No. 486, 61st Congress, 2d Session, 1910, pp. 4, 5.

Fourth. — The certainty and perfection with which food products may be conveyed from the place of production to the large centers of population where they are to be consumed is one of the triumphs of refrigeration; yet the refrigerator car service is only in its infancy so far as perfection of results is concerned. It is safe to say that our immense Pacific coast fruit trade could not exist without it. The over-sea carriage of products has also been developed along with the development of refrigeration as applied to this work.

Cold storage is a benefit to all mankind in that it allows of a greater variety of food during all seasons of the year. Health and longevity are promoted by the free consumption of fruits, and the placing of fresh fruits at the disposal of even the poorest of our citizens during every month in the year will certainly result in a wholesale benefit to mankind, so far-reaching in its effects as to be incalculable.[1]

Seasonal Movement of Cold-storage Products.

The leading commodities subject to cold-storage handling are perishable foodstuffs of seasonal production, including fresh meats, poultry, fish, fruit, eggs, butter and cheese. The production of these commodities is confined chiefly to certain seasons, more or less clearly marked. The heavy producing season for eggs is the three-month period April through June; that for butter, June through August. The season for poultry is not so definitely limited. Indeed, chickens may be placed in cold storage at almost any time throughout the year. The bulk of the poultry, however, is stored during the autumn months, October to December. There are different grades of poultry which have clearly marked seasons. Broilers, for instance, are obtained for a very limited period, chiefly during the months of July and August. Roast chickens are at their best in November and December. Turkeys are put away in December and January; fowls in November, December and January. Outside of these seasons it is almost impossible to obtain good fresh-killed poultry of the particular kind in question. The season of fish is also less limited than that of eggs and butter. Certain fish, however, are caught in the greatest volume during a comparatively short period in each year, varying from two weeks to two months. This period is known in the trade as "the time when the run is on." The season of flush production and heavy freezing in the case of fish comes during the later spring and early summer months. The months of heaviest production are April, May, June, July and a part of August. The product stored during these months is put on the market in the winter and early spring months, December through April.

---

[1] "Practical Cold Storage," Madison Cooper, pp. 11–16.

The function of cold storage is to distribute the output of these perishable foodstuffs of seasonal production throughout the market year by carrying the surplus supply of the flush season over to meet the shortage of the later months. Cold storage acts in this respect like a reservoir, taking up the surplus when the flow of goods into the market is copious, and giving out the reserve supply when the sources of production dry up. It enables man to supply the demand of the market when nature fails.

The seasonal ebb and flow of goods in and out of cold storage is illustrated most clearly in case of eggs and butter. The seasons of flush production and of short supply, as already stated, are less clearly marked in the case of poultry, fish and other products. The following records of receipts and deliveries of butter and eggs in the Quincy Market Cold Storage and Warehouse Company's plants for two years, ending April 1, 1911, exhibit the seasonal movement of these goods in and out of cold storage: —

Date.	Butter (Pounds).		Eggs (Cases).	
	Received.	Delivered.	Received.	Delivered.
1909.				
April,	47,770	1,399,134	114,582	1,668
May,	205,906	409,836	125,605	751
June,	4,197,012	104,244	91,477	1,825
July,	4,264,536	248,268	30,375	18,266
August,	2,522,271	701,556	24,883	31,952
September,	1,718,033	1,176,978	16,283	43,710
October,	1,357,274	1,509,294	7,957	61,875
November,	495,256	2,263,176	1,066	67,690
December,	53,436	2,428,110	1,617	76,318
1910.				
January,	194,982	1,925,607	175	74,621
February,	165,642	1,486,293	218	33,708
March,	111,378	1,674,330		2,233
April,	58,100	1,575,186	137,072	137
May,	753,799	116,433	146,318	331
June,	5,548,753	89,250	60,435	2,838
July,	4,490,890	334,560	42,533	17,301
August,	2,927,425	900,303	17,194	35,360
September,	2,268,048	1,184,271	15,611	61,436
October,	1,666,613	1,212,474	4,947	69,380
November,	351,322	2,350,335	2,505	68,760
December,	87,850	2,517,105	787	74,432
1911.				
January,	249,197	2,389,401	1,092	58,257
February,	270,770	2,104,464	2,099	39,779
March,	414,123	2,362,422	-	6,674

The flush season for eggs covers the months of April, May and June, approximately. During these months the receipts in cold storage are very heavy, and the deliveries are practically negligible in quantity. Then in July the season turns; withdrawals set in and receipts fall off. In July, however, the amount of the latter is still in excess, but in August and the following months the receipts drop below the deliveries. After September the receipts are practically negligible in quantity. The eggs stored in November, December, January and February are cold-storage eggs from other cities, and are held only a short time, until they can be used or sold. In the months of August to February, inclusive, the deliveries are very heavy, the highest point being reached in December.

The flush season for butter covers the months of June, July and August. In September the tide turns, but the receipts in this month are still heavy, exceeding the deliveries. In October the amount of the receipts tends to drop below that of the deliveries. After November the amount received is very small. Most of the butter received in December, January, February, March, April and May is butter that has already been refrigerated in the west, and comes to Boston in a frozen condition. In the months October to April the deliveries are very heavy, the climax of the upward movement being reached in December.

In the case of poultry, cold storage enables consumers to obtain certain varieties at times when otherwise they would be unobtainable. Without cold storage there would be few roast turkeys from January to November; not enough fresh broilers to supply more than a mere fraction of the demand from November to July; and few roast chickens from January to September.

Value of Cold Storage.

The value of cold storage in increasing the available supply of perishable food products throughout the entire year is recognized by every person who has given intelligent study to this subject. Where cold-storage facilities have not been provided to the extent that prevails in this country, their absence is keenly felt and greatly deplored. Several years ago the Canadian government, recognizing the need of encouraging the establishment of cold-storage plants in the interest of both producers and consumers, adopted the policy of subsidizing the construction of refrigerating warehouses.[1] The fact that France has practically no cold-storage system is pointed out in the report of an investigating committee appointed by the French government to study the causes of the recent increase in the prices of foodstuffs. According to press dispatches, this report states that France has only 13 cold-storage warehouses, 11 of which are of very small capacity. It is intimated that measures will be taken by the government to develop the provision of cold-storage facilities in France.[2]

2. ORIGIN AND DEVELOPMENT OF SCIENTIFIC REFRIGERATION.[3]

The modern highly perfected system of mechanical refrigeration is the product of a long series of inventions during the last century and a half. Cold-storage methods as employed to-day have been developed by persistent experimentation in the application of science to the art of food preservation. In his struggle for the mastery of the elemental forces of nature, man first gained control of heat, devising methods for its artificial production. Later, and with more difficulty, he gained control of cold, inventing devices for mechanical refrigeration. It would be hard to say which achievement has conferred greater benefits on the human race, through the improvement of living conditions, the increase of physical comfort, and the conservation of vital resources.

It is possible here merely to point out a few landmarks along the path of progress from the first crude attempts to produce artificial cold to the present elaborate apparatus of mechanical refrigeration.

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[1] See Appendix D for text of Canadian cold-storage act and statement of the Department of Agriculture concerning cold-storage warehouses.

[2] This reference to conditions in France is based upon press dispatches of the date of September 12, 1911; the commission has not been able to obtain a copy of the report cited.

[3] The material for this short sketch has been obtained from various sources, chiefly from a series of articles on the rise of mechanical refrigeration, published in "Ice and Refrigeration," 1901 and 1902.

Leading Inventions in this Field.

It was discovered over three hundred years ago that artificial cold is produced by the chemical action that takes place when certain salts are dissolved. The simple combination of ice and salt is said to have been used by Fahrenheit in 1762, when he placed the freezing point of water at 32 degrees above zero. As early as the middle of the eighteenth century scientific experiments were made to produce evaporation and refrigeration by applying the principle of nature's abhorrence of a vacuum. In 1755 Dr. William Cullen, utilizing this principle, invented the first ice machine, — not only of the vacuum kind, but of any type. The atmospheric pressure was reduced in this machine by an air pump, which increased the evaporation of water to such an extent as to produce intense refrigeration and ice. The affinity of sulphuric acid for water was next discovered, and was applied by Leslie in 1810 to make ice. In 1824 Vallance of France obtained patents in Great Britain for a refrigerating apparatus, using sulphuric acid.

An epoch-making invention in this field was made in 1834 by Jacob Perkins, who patented in that year the first machine capable of producing ice in commercial quantities. This machine was the forerunner of the modern compression apparatus, and ether was the refrigerating agent employed. "The evaporator containing the ether inclosed a system of pipes through which circulated brine, whose temperature was lowered to 5 degrees F. The brine then passed into a long receptacle containing boxes filled with water, and having frozen their contents, was pumped back to be again subjected to the refrigerating effect of the expanding ether. Thus the cycle was completed and the principles established upon which most modern refrigerating machines are founded. The brine, or indirect system, was thus foreshadowed." In

1856 Dr. James Harrison constructed a sulphuric ether machine which was an improvement upon that of Perkins.

Meanwhile, in 1851, Dr. John Gorrie had patented a cold-air machine. Prof. A. C. Twining of New Haven next invented a machine, using sulphuric ether as the refrigerant, taking out a patent in 1853.

A most important step in the evolution of ice-making machinery was the invention of the ammonia-absorption process by Ferdinant P. E. Carré, about 1860. The original machine is described as a very crude affair, consisting merely of two vessels, one surrounded by cold water, the other containing ammonia and water. Carré's machine was subsequently improved by various inventors. It was the ammonia-absorption system which made possible the great frozen meat trade of Great Britain.

The next great invention was that of the brine-circulating system by Charles Tellier, in 1873. It was a Tellier apparatus which brought the first cargo of fresh meat safely through the tropics, landing it at Rouen, France.

The foregoing were the principal path-breaking inventions in the development of mechanical refrigeration. The machines used for this purpose were greatly improved by a long line of minor inventions in this country and in Europe.

Modern Methods of Refrigeration.

The methods of refrigeration used in modern cold-storage plants are of two kinds, in both of which ammonia is employed as the refrigerating agent. In the system of direct expansion, the ammonia is pumped directly into the pipes running through the storage rooms. In the system of indirect expansion, or brine circulation, the ammonia is used to chill the brine, which is then circulated through the pipes. The method of direct expansion is generally used in the fish-freezing plants, for it is possible by this method to freeze foodstuffs more quickly than by the method of indirect expansion, or brine circulation. The latter method is the one generally employed for ordinary storage purposes, when quick freezing is not an important consideration.

Beginnings of Warehouse Business.

The first cold-storage room in this country, so far as can be learned, was constructed in 1865 in a shop on Beekman Street, New York city, for the purpose of fish storage. The room was refrigerated by brine-filled metallic tubes. This pioneer refrigerating plant was the outcome of inventions and experiments by Enoch Piper of Camden, Me. The processes of cooling and storing employed in the first storage plant were used in the trade until the introduction of ammonia freezers in 1892. In that year the first ammonia establishment for freezing fish exclusively was built at Sandusky, O. The method of freezing differs from the earlier process in that the pans of fish are placed on or between tiers of pipes carrying cold brine or ammonia, instead of being immersed in ice and salt.

The beginning of the frozen meat industry dates from the early fifties, when T. S. Mort and E. D. Nicolle of Sydney constructed a successful apparatus for the cold storage of meat products.

The cold storage of fruit was first made commercially successful by Prof. Benjamin M. Nyce of Indiana. He began building experimental houses about 1856. "These first fruit cold-storage houses were made air tight by the use of several thicknesses of tarred paper and beveled and air-tight doors. The jambs and door faces were cushioned with Canton flannel, and painted or coated with hot tallow. It was found, however, that the tarred paper impregnated the goods, and sheet iron was next used. A fan was afterwards introduced to keep the air in motion." In 1858 the first patent fruit refrigerator building was constructed for commercial purposes.

It is a fact of sufficient interest to state here that the first mechanical cold-storage plant established in this city was that of the Mechanical Refrigerating Company on North Street, opened about 1880 under the management of Mr. George H. Stoddard, now treasurer of the Quincy Market Cold Storage and Warehouse Company.

3. PRESENT EXTENT OF COLD STORAGE.

Cold-storage warehouses are classified as of two kinds, public and private. The former do a strictly warehouse business, renting space to outside parties and not storing goods on their own account. The latter store goods only for the owner of the establishment, being operated usually in connection with a meat or provision business. The Ice and Refrigeration Blue Book states the number of public cold-storage warehouses in 1911 as 860, having storage space of 169,541,000 cubic feet. The capital invested in these establishments is estimated at $75,000,000. Estimates of the value of goods stored in all the public cold-storage warehouses during one year range from $500,000,000 to $700,000,000. The maximum quantity of goods stored in 27 leading warehouses in 1910 is given in a statement filed by Mr. Frank A. Horne, president of the American Warehousemen's Association, with the United States Senate Committee on Manufactures, as follows: —

Eggs (cases, 30 dozen each),	2,088,401
Butter (pounds),	56,802,158
Meats (pounds),	30,169,252
Poultry and game (pounds),	28,379,136
Fish (pounds),	23,369,967
Number of storers,	9,380

These statistics are only partial and approximate, but they give a rough indication of the wide extent of this business. The United States probably leads the world in respect to the magnitude of the cold-storage business. Moreover, the business is growing at the present time with great rapidity. New cold-storage plants are being constructed in all parts of the country.

Quantity of Goods in Cold Storage.

The quantity of perishable food products placed in cold storage, large as it is in the aggregate, is comparatively small in proportion to the total production. In the last report of the United States Secretary of Agriculture the percentages of the total production of different classes of commodities placed in cold storage are estimated as follows: —

> The eggs received in storage in a year are approximately 13½ per cent. of the farm production; the fresh beef is over 3 per cent. of the census commercial slaughter of cattle; mutton, over 4 per cent. of that slaughter of sheep and lambs; fresh pork, 11½ per cent. of that slaughter of hogs; and butter, 25 per cent. of the creamery production.[1]

These estimates were made up from the returns received from warehousemen who sent in schedules to the Department of Agriculture in the course of its recent investigation of cold storage. The holdings in warehouses that sent in no returns were estimated by the government statistician on the basis of the returns actually received. The accuracy of these estimates has been called in question by representative warehousemen. The figures for butter and eggs are regarded as excessive. It is declared that there are not enough warehouses in the United States to hold the eggs which the government estimates represent to be in storage. The Ice and Refrigeration Blue Book states that at a maximum figure the amount of eggs in storage would be less than 7½ per cent. of the total produced, while the more commonly accepted estimate of the quantity placed in storage is less than 5 per cent. of the total production. The same authority places the value of the fish stored at 8 per cent. of the total catch. It would perhaps be fair to state, as a general estimate, that according to the available testimony and other indications less than 10 per cent. of the perishable food products of the country passes through cold storage.

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[1] Report of Secretary of Agriculture, 1911, p. 32.

Length of Storage Period.

There is a common notion that goods are generally held for very long periods in cold storage. This idea is refuted by the statistical evidence. The percentage of the different commodities held in storage for more than one year is so small as to be practically negligible. According to the last annual report of the Secretary of Agriculture, —

> At the end of twelve and one-half months fresh beef had .5 of 1 per cent. in storage; fresh mutton, .6 of 1 per cent.; fresh pork, less than .05 of 1 per cent.; poultry, .2 of 1 per cent.; butter, 6.5 per cent.; and fish, 13 per cent.[1]

The average period of storage is stated in the same report as follows: —

> The fresh beef received into storage during the year beginning with May, 1909, was kept there on the average of 2.3 months; the fresh mutton, 4.4 months; the fresh pork, .9 of 1 month; and the butter, 4.4 months. The poultry received during the year beginning with March, 1909, was kept on the average 2.4 months; the eggs, 5.9 months; and the fish, 6.7 months.[1]

A bulletin of the Department of Agriculture, published in 1904, gives average storage periods, as shown by returns from 43 cold-storage concerns, which differ somewhat from the figures given in the last annual report, but are not widely at variance with the latter. The average time for fresh meat is given as 58 days, or slightly less than 2 months; that for eggs as 159 days, or rather more than 5 months; that for fish as 133 days, or less than 4½ months; that for poultry as 131 days, or about 4⅓ months; that for butter as 156 days, or over 5 months; that for cheese as 146 days, or less than 5 months. It appears from these figures that the average period of storage is somewhere near 5 months, except in the case of fresh meats, for which it is less than 2 months.

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[1] Report of Secretary of Agriculture, 1911, p. 27.

Cold-storage Plants in Massachusetts.

The commission has compiled a complete list of public cold-storage concerns in Massachusetts, and has secured information concerning the extent and nature of the business of each establishment.[1] The number of public refrigerating concerns in the State which do a general storage business is 14, as follows: —

Allen, Slade & Co.,	Fall River.
Boston Terminal Refrigerating Company,	Boston.
Eastern Cold Storage Company,	Boston.
Eastern States Refrigerating Company,	Springfield.
Gloucester Cold Storage and Warehouse Company,	Gloucester.
J. L. Humphrey, Jr.,	New Bedford.
A. C. Hunt & Co.,	Springfield.
Martha's Vineyard Cold Storage and Ice Company,	Vineyard Haven.
E. H. Moulton Company,	Haverhill.
New England Cold Storage and Warehouse Company,	Pittsfield.
Quincy Market Cold Storage and Warehouse Company,	Boston.
John P. Squire & Co.,	Holyoke.
Genery Stevens & Son,	Worcester.
Worcester Cold Storage and Warehouse Company,	Worcester.

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[1] For reports from these establishments see Appendix F.

In general, it may be said that the public cold-storage establishments do a strictly warehouse business; that is, they rent space to outside parties and do not buy and store goods on their own account. The 6 largest concerns in the list do not own any of the goods stored in their plants. These are Boston Terminal Refrigerating Company, Eastern Cold Storage Company, Eastern States Refrigerating Company, New England Cold Storage and Warehouse Company, Quincy Market Cold Storage and Warehouse Company, Worcester Cold Storage and Warehouse Company. Only 5 per cent. of the goods stored in John P. Squire & Co.'s Holyoke plant is owned by the company. The other 7 concerns own percentages of the goods stored in their plants varying from 60 per cent. to 99 per cent. Most of these smaller plants were established in connection with a meat or provision business, and, while used primarily for private storage purposes, also receive goods owned by outside parties. The percentages of the goods in these plants owned by outside parties range from 1 per cent. to 40 per cent. These concerns are not, strictly speaking, public cold-storage warehouses, but, rather, private refrigerating establishments which do a small incidental business for outside parties.

In addition to these 14 establishments doing a general cold-storage business there are 6 companies that confine their business to fish-freezing and storage, as follows: —

Boston Cold Storage and Terminal Company, .	Boston.
Consolidated Weir Company, ...	Boston and Provincetown.
Fishermen Cold Storage Company, . . .	Provincetown.
Newburyport Fish Cold Storage Company, .	Newburyport.
North Truro Cold Storage Company, . .	North Truro.
Provincetown Cold Storage Company, . .	Provincetown.

The fish-freezing plants do only a private storage business, with the exception of one company, the Boston Cold Storage and Terminal Company, which does a public warehouse business, and owns of the fish stored in its plant only 160,000 pounds of bait fish. Thus, in the case of the fish-storage concerns, the goods are owned by the company, while in the case of the general storage establishments the goods are owned, as a rule, by outside parties. The fish-storage warehouses are private plants, while the general storage warehouses are public plants.

The capital stock of the 14 companies doing a general cold-storage business, so far as can be ascertained, amounts to $2,715,000. The total capacity of the plants operated is 14,065,000 cubic feet. The capital stock of the 6 fish-freezing companies is estimated at $345,000. The total capacity of the plants of these companies is 510,800 cubic feet.

The range of commodities stored in the general refrigerating plants is very extensive, as may be seen by the list of goods stored by the Quincy Market Cold Storage and Warehouse Company, printed elsewhere in this report.[1]

The chief commodities subject to cold-storage handling may be said to be eggs, butter and poultry. The total amount of these commodities stored in Massachusetts plants in 1910, so far as can be ascertained, was approximately as follows: —

Eggs (cases),	700,000
Butter (pounds),	20,000,000
Poultry (pounds),	11,000,000

The importance of the rôle which cold storage plays in the modern system of distributing food products may be illustrated by certain statistics for the city of Boston. The total amount of eggs received in the city of Boston in the year 1910 was 1,431,686 cases; the receipts of butter amounted to 38,326,520 pounds; the receipts of poultry were

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[1] See page 254.

24,141,015 pounds. Comparing the total receipts with the amounts stored in the warehouses of the three Boston refrigerating companies, we find that the amount of eggs placed in cold storage was 555,725 cases, representing 38 per cent of the total receipts; the amount of butter stored was 15,422,054 pounds, or 40 per cent of the total receipts; and the amount of poultry in storage was 10,902,362 pounds, or 45 per cent. of the total receipts.

Condition of Cold-storage Plants.

The members of this commission inspected cold-storage plants in different cities to observe the manner in which they are conducted. In general, conditions were found to be very satisfactory. It appears that scientific methods of refrigeration are carefully followed. The larger plants are of modern construction, most of them having been built within the last ten years. The sanitary conditions in these plants are excellent; the temperatures are properly maintained, and the ventilation is adequate.

In this connection it may be interesting to state that the proper temperature for cold-storage preservation varies widely for different classes of goods. Cheese is held at a temperature of 33 to 35 degrees, as freezing destroys the quality of this product. Eggs also are kept above the freezing point, which, however, on account of the natural heat of this product is several degrees lower than for cheese, the proper temperature being about 30 degrees. Butter is frozen hard, and is held at temperatures ranging from zero to 10 degrees above. Meat and poultry when first placed in cold storage are subjected to the "sharp freezer" temperature, as it is termed, which may range from 10 degrees below zero to 15 degrees above. After they have been hard frozen in this temperature, meat and poultry are then transferred to rooms in which an ordinary cold-storage temperature is maintained, which means

15 to 32 degrees above zero. The temperature is ordinarily held at 15 to 20 degrees above.

No attempt was made in the inspections conducted by members of the commission to examine in any detail the various commodities in storage, with a view to determining their condition. Such examination as was made, however, failed to disclose any conditions that might be termed objectionable, except in one small plant. In this establishment, which stored small quantities of goods for outside parties, being used mainly for private storage in connection with a meat and provision business carried on by the owner, the representatives of the commission found a small quantity of meat and poultry in one room which was obviously in an inferior, if not unwholesome, condition. The goods had been stored for local dealers, who had evidently deposited them in storage because unable to dispose of them at the time, with a view to placing them again on the market when prices advanced. None of these goods had been in storage for a very long time, and it was apparent that they could not have been in fit condition for storage when brought to the warehouse. This case was the only one of the kind which came to the notice of members of the commission, but it drew attention to the possibility of abuses of this kind in small plants used by dealers for disposing of odds and ends of stock left over in the market.

The results of inspections of cold-storage plants in 1910, conducted by inspectors of the United States Department of Agriculture, with a view to determining the general practices concerning the cold storage of food products, disclosed generally satisfactory conditions in the 37 establishments visited in different parts of the country. The chief inspector, in communicating the results to Dr. Harvey W. Wiley, stated: "The great majority of these institutions were found to be in a clean and sanitary condition, and in only three cases were the conditions such that exception could be taken to the propriety of housing any food substance under the conditions prevailing."[1] It appears that the government inspectors found conditions in the establishments which they visited very similar to those in the plants visited by members of this commission. No serious complaints can be brought against the cold-storage warehousemen in general on the ground of unsanitary or unscientific methods of conducting their establishments. It is evident that any abuses in this respect are exceptional.

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[1] Report of Committee and Hearings before United States Senate Committee on Manufactures, relative to Foods held in Cold Storage, 1910, p. 172.

II.

MAIN DIVISIONS OF INQUIRY.

The subject of cold storage naturally divides itself into two main branches of inquiry: first, the effects of cold storage on the health of the people; second, its effects on the cost of living.

It has been charged against cold storage that it enables dealers to hold food products for so long a time that they become unfit for consumption. Goods preserved by the refrigeration method are declared to be inferior to fresh food in quality, wholesomeness and palatability. The consumption of food held for long periods in cold storage is said to produce various disorders. In short, cold storage is regarded in some quarters as a menace to public health.

It has been contended, furthermore, that cold storage enables speculators to withdraw food products from the market and thus force up prices to an artificial level. The working of the natural laws of demand and supply is said to have been obstructed by the speculative manipulation of food prices through the agency of cold storage, to the great injury of consumers. In short, cold storage is held to be an instrument of monopoly and a cause of high prices.

The questions that arise in any inquiry into cold storage relate, therefore, first, to the effects on public health, and second, to the effects on food prices.

1. INFLUENCE OF COLD STORAGE ON HEALTH.

The charge that cold storage in general is detrimental to public health is refuted by an impartial examination of this subject in its hygienic aspects. Undoubtedly abuses have arisen in this field, but unquestionably the gains from this method of preserving perishable foodstuffs have outweighed any evils that have developed in its train. Instead of being a menace to public health, cold storage has, in the main, exhibited itself as a great agency for the conservation of the vital resources of the population. It has enlarged, diversified and enriched the food supply of the people. In the distribution of the food supply to the congested population of the great cities especially, cold storage is an indispensable factor. Without cold storage the crowded masses in the urban centers would be obliged to subsist on a dietary at once more meager and more costly than that enjoyed at the present time.

The benefits that have been brought by cold storage are admitted by all who have given the subject unprejudiced consideration. The Hon. James Wilson, Secretary of Agriculture, regards cold storage as a great benefit to humanity. "It is a great blessing," he declares, "to be able to put meat, vegetables and fruit into cold storage where they will keep. There is no doubt about that." Dr. Harvey W. Wiley, Chief of the Bureau of Chemistry of the United States Department of Agriculture, also characterizes cold storage as a great blessing. Similar statements have been made by many eminent authorities on food problems and public hygiene. Prof. William T. Sedgwick of the Massachusetts Institute of Technology, who ranks among the foremost experts on questions affecting the health of the people, characterized cold storage, in his testimony before this commission, as one of the most important and beneficial methods of food preservation. "When we got the art of canning," he stated, "we made a great step forward in saving the surplus of one season and time up against the scarcity of another season and time, and when we got cold storage we made another important forward step, in my opinion almost equally, perhaps equally, as great. Every one admits that the salvage of food, especially in these days of increasing costs and increasing population, is of fundamental importance." Commenting upon the attacks on cold storage in the newspapers and magazines, Professor Sedgwick declared further: —

> So far as I am aware, there is no evidence whatever that cold storage is in any way prejudicial to the public health. On the contrary, it is one of the greatest aids to public health, in that it makes food more accessible and more abundant, and thus enables people to keep up their strength and to avoid such diseases as scurvy, from which the human race formerly suffered so intolerably. Various allegations, of course, have been made touching the wholesomeness of cold-storage materials, such as that deterioration takes place during cold storage, whereby people are poisoned, or otherwise badly affected, but I have yet to hear of a single instance of carefully investigated and well-authenticated food poisoning due to the effects of cold storage, — to deterioration during proper cold storage. . . . In fact, I am enthusiastic about cold storage, and what it is doing for mankind to-day, on land and on sea, in building up vital resistance and driving out the old disease of scurvy, making it possible to live in the woods, or the wilderness, or desert, or on shipboard, for long periods without otherwise fresh food.

Changes in Food Products during Cold Storage.

It is generally admitted that some changes take place in food products placed in cold storage, and that these changes are not for the better. A cold-storage product is never just as good as the fresh article. This has been disputed by representatives of the cold-storage interests, some of whom have gone so far as to maintain that refrigeration prevents the deterioration of food products, and that if goods are in prime condition when they are put in storage they will come out as good as they were when they went in. It has been contended that practically no alteration takes place in meats or poultry when kept in a solidly frozen condition, no matter how long the period of storage may be. The manager of a Cleveland, O., cold-storage company states: "We have carried undrawn poultry successfully, and with very little detriment to the stock, for a period of two years." The assistant secretary of a New York refrigeration concern declares: "In our experience we have carried frozen poultry for four years, and found it as to appearance at the end of that time in a wholesome condition, and the same was eaten with no injurious effects. Poultry kept in a freezer and kept at the right temperature will keep for an indefinite length of time in a healthful condition."

This contention is not supported by the results of scientific investigation. In the first report of experiments to determine the effects of cold storage upon chickens, Dr. M. E. Pennington, expert of the United States Department of Agriculture, declared: "The dictum of the warehousemen that there is no change in cold-storage poultry, and that it may be kept for an indefinite period, cannot be accepted in its entirety. Both microscopic study and the taste of the cooked fowl confirm the fact that microscopically visible physical degeneration does take place."[1] On the other hand, it is true that the changes in unrefrigerated poultry are much more marked and more rapid than in cold-stored fowl. Dr. Pennington has stated that poultry deteriorates more in twenty-four hours at a room temperature of 70 degrees than it would in proper freezer temperature in twelve months, provided it is stored in proper condition.

The investigations thus far made with respect to the effects of cold storage on various food products appear to warrant two general conclusions with respect to the nature and extent of the changes that take place: first, that there is a distinct loss of flavor when storage is prolonged beyond a very short period; second, that there is, however, no essential loss of wholesomeness during considerably prolonged periods of storage. It is, of course, assumed always that the goods are in proper condition when placed in storage. If this is not the case, the deterioration during storage may be rapid.

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[1] "Changes taking Place in Chickens in Cold Storage," M. E. Pennington, Yearbook United States Department of Agriculture, 1907, p. 206.

Experiments with Cold-storage Poultry.

The experiments conducted in the Bureau of Chemistry of the United States Department of Agriculture throw light on the question of the edible quality of cold-storage poultry. Both fresh and cold-storage birds, the latter of different periods of storage, were cooked and served in precisely the same way, to a testing jury of six persons. Dr. Wiley describes the results of the experiments as follows: —

> At the end of the first three months the jury's verdict in regard to the taste of the articles was wholly unsatisfactory as to being able to discriminate between the cold-storage bird and the freshly killed bird; about as many preferred the one as preferred the other. After a number of discriminations of that kind, on this as well as on other subjects, we came to the conclusion that there was no perceptible deterioration of flavor in the space of three months. In the second period of three months there was a very preponderating testimony in favor of the freshly killed bird, but there were still numerous instances where a juryman would select the six months' bird as being superior in flavor to the fresh bird; but there was such a preponderating vote that we assumed from this fact that a considerable deterioration in taste had taken place at the end of six months. At the end of nine months it was a rare thing for any man on the jury to make any mistake in regard to which was cold-stored and which was not. Occasionally there would be, — as you might expect in all juries generally, — there would be one man on the jury who was obstinate; but the verdict was nearly always unanimous. At the end of the year there was no instance, as far as I can remember, of any juryman having preferred the cold-storage bird.
>
> My own conclusion, from a study of numerous tests of this kind,

is that nine months is the limit of storage so far as chickens are concerned, without distinct impairment of flavor; and applying that to wholesomeness, I can only say that the chemical examinations of these cold-stored birds at nine months and twelve months failed to reveal the development of any so-called poisonous decomposition of the product as far as chemistry is concerned. There was no trace of any such body as far as we could determine by chemical means. Without infections of animals, there was no trace of any such body as that which is commonly known as ptomaine, which is a very common product of the decomposition of flesh; and I infer from that, that, judging by chemical means, there was no objection to cold-storage fowls of the age of nine months or even twelve months, as far as the development of any poisonous product was concerned.[1]

Relation of Palatability to Wholesomeness.

With respect to the question as to the relation of palatability to wholesomeness, which arises in this connection, there is a difference of opinion. Dr. Wiley contends that palatability is an essential factor in the wholesomeness of food, and that consequently the loss of palatability which takes place during cold storage is practically equivalent to loss of wholesomeness and nutritive value. In his testimony before the United States Senate Committee on Manufactures he discussed this question as follows: —

> Now, you gentlemen have doubtless all had the same experience that I have had frequently, in having a whole meal spoiled by a single order of cold-stored products that have gone bad; that is, not poisonous, but bad tasting, unpalatable and unattractive; and that is especially true at the beginning of a season of what I call seasonable goods. There are certain kinds of products that have seasons. Now, chicken is not one of them; you can have chicken the year round. I will tell you one of them; that is shad. I don't believe that cold-stored shad ought to be allowed to be sold after the season for that shad has passed. I have had, right here in this town, a number of experiences in the beginning of the season, when the shad

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[1] Report of Committee and Hearings before United States Senate Committee on Manufactures relative to Foods held in Cold Storage, 1910, pp. 7, 8.

come from the southern waters, and then they are taken to cold storage, — shad left over from the last of the season, and sold to our people in this city and other cities as shad from the south — uneatable to my taste, though not poisonous; but their taste and flavor are of such a quality that to serve me a dish like that spoils the rest of the dinner. The same is true with chickens. I have eaten chickens, or tried to eat them, which probably are nutritious, — certainly not poisonous, — but which are of a degree which not only makes them unpalatable of themselves, but they throw a pall over the whole meal. . . .

I want to say a word about the influence of palatability on the wholesomeness of food. I do not think there is any doubt by hygienists and physiologists that the sense of taste is not wholly for man's pleasure; it has a direct relation to wholesomeness. Things that are wholesome as a rule taste good, and things that usually are wholesome when they become unwholesome taste bad; with the nose, which is part of the taste, and with the palate all animals discriminate in their food. You will see that in all animals they will discriminate at once by the smell and by the taste. It is undoubtedly true that the odor which we like, which is pleasant to us in food, and the taste which is pleasant to us in food, are the chief excitants of those glands which secrete the digestive enzymes, — those bodies which cause digestion, like peptone. . . . You know how the mouth waters when a good dinner comes to the sense of smell. What does that mean? It means the salivary glands are excited; they have a digestive ferment. At the same time the salivary glands of the stomach are excited. That has been proved by actual demonstration, when a dog's stomach has been taken out and a section of it separated, except so far as the stomach part is concerned, from the rest, and then sewed up and made a little stomach of itself on the outside, where it could be observed. When the dog is hungry, and that class of food is brought to him, he smells it and tastes it. The salivary glands of the little stomach on the outside are very active and filled up with peptone; the same on the inside. If a dog is fed through a tube with the same substance, not allowed to smell it or taste it, practically no activity takes place in the stomach on the outside. That is why forced feeding, feeding through a tube, nearly always causes indigestion.

Senator FRAZIER. You would reason from that that the things that taste good and smell good to us are wholesome?

Dr. WILEY. Yes; they are the indices of wholesomeness to that particular animal, — the wholesomeness of the product, and there isn't anything that impairs the taste of your food but impairs your digestion just to that extent. Every one of you know, you have had experience where some bad tasting thing has upset you altogether.

Senator SMITH. Spoiling the whole meal?

Dr. WILEY. Yes; one bad smell will do it, one bad taste, one bad oyster; you put your dish aside; you don't want any more oysters, not very much of anything else in that meal. It has such an intimate relation to digestive process, I maintain, that any method of treating food which impairs the taste, its flavor and its odor is deleterious to health, irrespective of the presence of any product which in itself is poisonous.[1]

The contention of Dr. Wiley that palatability is necessarily related to wholesomeness is disputed. Dr. William J. Gies, professor of biological chemistry in Columbia University, declares that unpalatability may not indicate unwholesomeness. His testimony on this point is as follows: —

Mr. LITTLEFIELD. Will you be kind enough to state to the committee, from either the scientific or practical standpoint, what the facts are as to the relation of palatability — so called popularly — to the wholesomeness or fitness of a product for food?

Dr. GIES. A thing may be palatable but may not be wholesome, saccharine, for example. On the other hand, material may be unpalatable but wholesome. For instance, ice cream with vinegar in it would not be palatable, but the combination is wholesome. Milk with a struggling fly in it might not be palatable, but there would not be any difference in wholesomeness unless the fly introduced harmful bacteria. Does that cover the point in your inquiry?

Mr. LITTLEFIELD. In a general way. Can you predicate any general conclusion as to wholesomeness upon the establishment of palatability?

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[1] Report, United States Senate Committee on Manufactures, 1910, pp. 10, 15, 16.

Dr. GIES. No. If palatability, as determined in a given case, is also accompanied by signs of deterioration, then unwholesomeness might be indicated, but not with certainty. The unpalatability that accompanies some kinds of putrescence may or may not indicate unwholesomeness. Putrid cheese of certain types is wholesome, but it is very unpalatable except to those who have been educated to appreciate it. With some people, however, such cheese is very unwholesome.

Mr. LITTLEFIELD. Is not palatability essentially an individual factor?

Dr. GIES. It is an individual matter that has or has not a relation to wholesomeness, according to circumstances. . . .

Unwholesomeness must be proved directly. It does not depend upon the individual decision as to palatability.[1]

Alleged Danger of Ptomaine Poisoning.

It is clear that while cold storage considerably prolonged results in loss of flavor, — and possibly also of nutritive value, — the opinion frequently expressed that cold-storage products are necessarily deleterious to consumers is quite unfounded. Cases of ptomaine poisoning alleged to have resulted from the consumption of cold-storage foods are often mentioned in the newspapers. Manifestly, however, this sort of testimony is of dubious value. Two alleged cases of such poisoning are given by Dr. F. J. Crumbine, secretary of the Kansas State Board of Health, in a letter to the chairman of the United States Senate Committee on Manufactures, April 20, 1910. He writes: —

I can give you no definite data concerning any scientific investigation this department has made in the matter of wholesomeness or unwholesomeness of cold-storage food products.

I have had, however, a personal experience which is more convincing to me than all the scientific data ever compiled. This experience is substantially as follows: four years ago I took dinner on

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[1] Hearings before Committee on Manufactures, United States Senate, on Food held in Cold Storage, 1911, p. 82.

> a dining car on the Missouri Pacific Railway near Coffeyville, Kan., and ordered half a chicken for my meal. I was served with cold-storage chicken, which produced such an attack of ptomaine poisoning as to almost cost me my life. It was almost six months before I entirely recovered from this severe case of poisoning.
>
> A second experience, which was calculated to be intensely amusing had it not been so serious, was that which occurred at Mackinac Island in August, 1908. It was the occasion of the annual conference of State and national food and dairy officials. The majority of the States were represented, together with a large delegation of federal officers, headed by our mutual friend, Dr. H. W. Wiley. We had been accounting ourselves particularly fortunate that we were in the land, or rather the waters, of the celebrated lake whitefish; and our mouths, metaphorically, watered at the thought of the feast that was before us. Whitefish was served on the menu every day; but about the second day it was difficult to assemble enough of the food officials to hold a conference, owing to the fact that almost the entire delegation were suffering with ptomaine poisoning, and some of them seriously ill.
>
> A raid on the steward's pantry by Commissioner Bird of Michigan and one of the federal officials disclosed the fact that they were feeding the food officials on cold-storage whitefish of the vintage of 1907 or older. Any of the food officials present at that meeting can give you their testimony, which I am constrained to say is also of greater value than mere scientific compilations.[1]

On the other hand Dr. William T. Sedgwick stated in his testimony before this commission: —

> I have myself, like everybody else, repeatedly consumed cold-storage materials, and while I am ready to admit that the flavor is sometimes changed, and not always for the better, I do not know of any well-authenticated, carefully investigated case of food poisoning or other ill effects due distinctly to cold storage.

In this connection it has been contended that there is even less danger of ptomaine poisoning from cold-storage food than from goods that have not been subjected to the refrigeration process, since freezing inhibits the growth of bacteria. This contention is based upon certain results of experiments with drawn and undrawn poultry kept in cold storage, conducted by Dr. William F. Boos for the Massachusetts State Board of Health. Dr. Boos states that in cold storage itself no chemical changes occur. "This is shown by (*a*) the absence after nine months and more of cold storage in both drawn and undrawn cold-storage fowl of ptomaine and decomposition products in general, except such as are formed by bacteria and autolytic changes occurring before the birds are placed in cold storage, and after they are thawed; (*b*) the negative results of animal inoculations, with extracts obtained from the two kinds of poultry."[1] Dr. Mark W. Richardson, secretary of the State Board of Health, in his testimony before this commission, replied to a question as to whether he had ever known of any evidence of ptomaine poisoning which developed in cold-storage food while kept frozen: "I should say, on the contrary, that Dr. Boos's experiments would show that it couldn't." He remarked further that, if food were kept for any length of time after being taken out of storage, the bacteria would have a chance to develop.

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[1] Report, United States Senate Committee on Manufactures, 1910, pp. 290, 291.

Proper Preparation of Goods for Cold Storage.

It is evident from the experiments with cold-storage products that the condition of the goods when they come out of storage depends very largely upon their condition when they go in. The greatest care is needed in the selection and preparation of food products for cold storage. Lack of such care will lead to unsatisfactory results, even if the goods are handled with the utmost care during the cold-storage period, so far as temperatures and other conditions are concerned.

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[1] Annual Report, Massachusetts State Board of Health, 1907, p. 282.

In the case of poultry, the researches of Dr. Pennington have shown that chickens designed for cold storage should be treated in certain ways, and that neglect of any of the requisite precautions may produce conditions leading to harmful deterioration. As a result of Dr. Pennington's investigations a notable improvement has taken place in the commercial handling of poultry during recent years. The national organization of the trade is co-operating with Dr. Pennington in bringing about such improvement. This movement for the application of scientific methods in the handling of cold-storage poultry is a most hopeful and promising one. The main results of Dr. Pennington's experiments in this field may be summed up as follows: [1] —

1. The birds should be killed and bled properly. This means that, in killing, the principal veins in the neck must be severed and the fowl bled completely. Imperfectly bled fowls have inferior keeping power, deteriorating more rapidly than well-bled chickens; they also present a far less attractive appearance.

For example, an incomplete removal of the blood of a chicken when it is killed results in a reduced stability of the flesh, as well as an undesirable appearance of skin and muscle. Even in prompt marketing, the deterioration of a fowl incompletely bled is to the detriment of its value and flavor as food. When frozen, no matter how low the temperature nor how perfect the condition of the storage warehouse, its discoloration increases, and the time of its good keeping, so far as flavor and appearance go, is reduced as compared with its well-bled fellows. Hence, the bleeding of a fowl is a matter of greater importance than might appear at first sight. An anatomical study of the blood vessels of the neck and head of the domestic fowl has already been made, and on the basis of this information a method of cutting to bleed has been recommended.

At least 30 per cent. of all the chickens prepared for market, both for storage and for prompt consumption, are incompletely bled. Their value is reduced from 2 to 5 cents per pound thereby.

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[1] See Circular No. 61, United States Department of Agriculture, Bureau of Chemistry, M. E. Pennington and H. M. P. Betts, and Circular No. 64, M. E. Pennington.

2. The birds should be dry-picked and not scalded. The scalding of poultry injures the skin in such a way as to diminish the keeping qualities.

If water-chilling poultry is detrimental to its good keeping, it can readily be seen that the custom of scalding poultry, which prevails in so many sections, must be even worse. Water-soaking the skin of a chicken destroys its histological integrity by an endosmotic bursting of cell walls, and lowers its resistance to bacterial invasion by diluting the contents of the cells. The skin of a chicken chilled in water contains at least 18 per cent. more moisture than when air chilled; hence the blisters which form after freezing a water-chilled fowl. Scalding the chicken for the removal of the feathers necessarily alters the structure of the skin far more than soaking. It reduces its protective properties, as far as bacteria are concerned, to almost nothing. Undoubtedly, too, its deleterious action is even deeper seated, since the keeping time of a scalded chicken is reduced to a very low figure, comparatively. The nature of this deeper action is now under investigation.

A study of the behavior of dry-picked and scalded fowls after freezer storage shows that the scalded specimens vary greatly in condition, even after three months' holding. Loss of color, texture, flavor and general good quality is more rapid in scalded than in dry-picked chickens. If any delay occurs before storage, or any error in handling is made, the scalded birds show the effect very soon, even if hard frozen. Incipient decomposition, though retarded in a frozen scalded fowl, is not checked to the same extent as in the dry-picked. Indeed, under the same disadvantageous conditions deterioration will have obtained a good foothold in the scalded stock before it has made any headway with the dry-picked. On entering the freezer a scalded bird may show no signs of active decomposition, yet after six or nine months a distinct greening of the skin may be observed, and while quick thawing may be accomplished without the appearance of an odor of putrefaction, yet it does come within a few hours, and then increases rapidly.

3. The birds should be dry-cooled, to take out the animal heat, before being placed in storage, — that is, chilled in air, rather than in water or by ice.

The subject of refrigeration has a direct bearing on the study of the comparative merits of removing the animal heat from poultry by cold water and ice or by dry, cold air; and of maintaining the skins of the birds in a dry condition, or of carrying them in cracked ice throughout their marketing. The water cooling and ice packing, keeping as it does the skins of the birds always wet, enables the bacteria, which are universally present, to multiply and penetrate the skin or any abrasion with but slight hindrance, since the temperature maintained by cracked ice, when moisture is so plentiful, is not very efficient in inhibiting bacterial growth; and bacterial growth in flesh means decomposition of some kind, too frequently undesirable. A bacteriological study of skins of chickens chilled in dry air and in water and ice shows a marked preponderance of organisms in the latter after even a short keeping time, as marketing practices go. In accordance with the fact that, for keeping, flesh should be as nearly sterile as possible, chemical analyses of air-chilled and water-chilled chickens show that the former change more slowly. . . .

If freezer storage is to be applied for long preservation, it is the custom of the more progressive packers to air-chill the stock, though the more conservative men, or those not equipped for air-chilling, habitually store large quantities of water-chilled poultry. Within a few months such poultry can be identified by small, dry, scaly areas, chiefly on breast and thighs, and by a loss of the color and translucency characteristic of fresh birds which have not been water-soaked. After thawing, whether in water or air, the flesh is not so firm nor the color so good as in the case of the air-chilled poultry.

4. It is important also that poultry should be packed air tight.

It has been commonly held by the industry that fresh air is needed in the packages of frozen poultry if long keeping is desired; hence, boxes have been far from tight. Experimentation, on the other hand, has shown that flavor, appearance, texture and all-round quality have been enhanced by storage in a tin container, or even in a pasteboard carton, from which air is excluded. A number of these experiments have been made, using chickens dressed in various ways. The analyses of the flesh and a record of the general condition of the birds so packed, as compared with the usual box pack, are now in course of compilation.

Poultry properly prepared for storage in these respects can be kept from one season to another in a well-constructed and conducted warehouse.

It is a comparatively simple matter to keep birds in good condition from one season of production to the next in a well-constructed cold-storage warehouse, provided those birds are received at the warehouse properly dressed, chilled and packed, and with such promptness that decomposition has not obtained even a slight foothold. Under such conditions the responsibility of the warehouse is the maintenance of cleanliness and a constant temperature which is not above 15 degrees F. (—9 degrees C.), and which preferably should be nearer 10 degrees F. (—12 degrees C.). If, on the other hand, the poultry is not properly prepared for storage, or if decomposition has begun (even though it may scarcely be perceptible to any of the senses), it is impossible with the lowest temperatures obtainable to prevent deterioration.

5. When poultry is removed from storage it should be dry-thawed in cool air, and not soaked in water.

The thawing of the frozen chicken preparatory to its use as food is a matter of great importance, if the good qualities of the fowl are to be preserved. It was formerly customary to thaw birds by throwing them into cold water. This method, on a commercial scale, is practically certain to result in thawing in dirty water, thereby contaminating the flesh so that decomposition proceeds very rapidly. It is also deleterious, in that it extracts a considerable part of the flavor of the flesh. This being the first attribute of the fresh chicken to be lost by cold storage is the one which should be most carefully guarded. To preserve it, as well as the appearance of the fowl, thawing should be accomplished by hanging the bird in cool air, if possible at the temperature of an ordinary ice refrigerator, for twenty-four hours. This time is sufficient to thaw a bird of the usual size. A slightly longer period may be required to thaw large roasting chickens. There should also be some circulation of air, that the moisture which settles on the skin of the chicken may evaporate. So thawed, a bird well prepared and stored for a reasonable length of time — that is, from one season of production to the next as a maximum — will have a clear, fresh color in the skin, which will be soft in texture, slipping easily from the muscles beneath it. The flesh of breast and thighs may be very slightly deeper in color than the fresh specimen, but so little that the change is negligible from a practical viewpoint. The fat is generally a little deeper in color and may have a slight taste and odor of rancidity.

Question of Drawn versus Undrawn Poultry.

The question whether poultry should be drawn before being placed in storage has been warmly debated. Undoubtedly the popular opinion on this subject is that poultry should be drawn. The average person naturally concludes that a bird properly drawn and cleaned will keep better than a bird that has not been treated in this way. The common prejudice against undrawn cold-storage poultry finds expression in a recent newspaper article on "Boosting the Price of Food," as follows: —

> While much agitation is in progress over a pure food law, some wise congressman ought to introduce a bill making it a penal offense to put fowls into cold storage without being "drawn." At present, chickens, ducks and turkeys merely have their necks twisted and their feathers removed, after which they are packed in a cold room for months with the intestines unremoved.

Similarly, in an article on "Wholesome Food and Good Cooking," in the Century Magazine for November, 1911, Mr. Henry T. Finck deplores the fact that only a very small percentage of fowls which are placed in cold storage are drawn, "the result being that by physiological process known as osmosis the meat becomes tainted in a most offensive manner." The long-suffering public, this writer declares, is at last becoming aroused, — "convinced that many obscure disorders of the digestive tract are due to the consumption of undrawn and other cold-storage poultry."

The popular prejudice against undrawn poultry is now known to be pure fallacy. The common notion on this subject has been completely discredited by scientific investigation. The results of the experiments of Dr. Pennington show conclusively that undrawn poultry has superior keeping qualities as compared with drawn, both during and after the storage period. This conclusion is also confirmed by investigations conducted by Dr. Hubert R. Brown and Dr. William F. Boos, for the Massachusetts Board of Health. In her testimony before the United States Senate Committee on Manufactures, in May, 1911, Dr. Pennington stated that the common opinion of the laity that only drawn poultry should be placed in storage is mistaken. "Our examinations," she declared, "have all proved to be in favor of the undrawn bird." She explained that bacteria developed to less extent in an undrawn than in a drawn fowl. The reason she expressed graphically by this comparison: "You cannot expect a chicken that has been opened and exposed to contamination by the air to retain its maximum keeping quality any more than you could expect it in the case of an apple that has been cut in two."[1]

In a report on poultry kept in cold storage, for the Massachusetts State Board of Health in 1907, Dr. Brown stated the conclusion that undrawn chickens placed in cold storage show much smaller numbers of bacteria than drawn fowl, and that under given conditions decomposition proceeds at a more rapid rate in the thawed drawn chicken than in the thawed undrawn one. His conclusions in full were as follows: —

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[1] Hearings, United States Senate Committee on Manufactures, 1911, p. 72.

1. Poultry kept at temperatures ranging from —5 degrees to —14 degrees F. undergoes no decomposition as a result of bacterial activity.

2. Freezing destroys the red and some of the white blood corpuscles.

3. Freezing temperatures as low as —14 degrees F. destroy a large percentage of the bacteria present, but do not affect the more resistant ones.

4. When the tissues are thawed, they become moistened by the melting ice crystals, and in this condition bacterial growth is facilitated and decomposition of the tissues and contents of the cells is promoted.

5. In the drawn chickens placed in cold storage aerobic conditions prevailed throughout the pleuro-peritoneal cavities. The undrawn chickens showed much smaller numbers of bacteria in the pleuro-peritoneal cavities. On account of the closed cavity, partial anaerobic conditions prevailed in these birds.

In decomposing meats, putrefactive aerobic bacteria may possibly produce the primary stages and prepare the way for anaerobes which possibly control the intermediate stages of decomposition. By the combined action of both, decay is brought about, but it is probably finished by aerobic bacteria.

From these facts it appears that, given the aerobic conditions and the larger numbers of bacteria growing on the moist surfaces and tissues of a thawed drawn chicken, decomposition will proceed at a more rapid rate than with an undrawn one containing fewer bacteria existing under partial anaerobic conditions.

6. In freshly killed, unfrozen drawn chickens, the surfaces and tissues become dry within a very short time, and, although aerobic conditions prevail, the bacteria cannot grow because of lack of moisture.

7. In freshly killed, unfrozen and undrawn chickens, on account of the closed pleuro-peritoneal cavities, there is no drying of the tissues and surfaces, and facultative aerobic and anaerobic bacteria from the intestines rapidly cause decomposition.

8. By the removal of the viscera without the spilling of the contents of the alimentary tract decomposition can be prevented absolutely. The operation requires about two minutes.

9. Briefly stated, decomposition depends largely upon the presence of moisture in the tissues, for moisture is absolutely essential to bacterial growth. In freshly killed birds, ordinarily or properly drawn, the surfaces quickly become dry. In cold-storage birds, no matter how they are drawn, the tissues will be moist, because of the melting of the crystals of ice. If properly drawn, there would be but few bacteria present capable of causing decomposition.[1]

Dr. Boos's findings were also in favor of undrawn poultry. He found that when chickens were removed from cold storage and exposed to a warm temperature, the undrawn birds showed better keeping qualities. He added, however, that poultry designed for cold storage should be drawn "in a different manner from that usually followed." "Ordinary drawing," he declared, "is worse by far than no drawing at all." He summarized the results of his investigations as follows: —

1. In cold storage itself no chemical changes occur. This is shown by: —

(*a*) The absence, after nine months and more of cold storage, in both drawn and undrawn cold-storage fowl, of ptomaines and decomposition products in general, except such as are formed by bacteria and autolytic changes occurring before the birds are placed in cold storage and after they are thawed.

(*b*) The negative results of animal inoculations, with extracts obtained from the two kinds of poultry.

2. When fowl are taken out of cold storage and exposed to a temperature of 68 degrees F., the conditions of exposure being the same, the undrawn birds show better keeping qualities.

3. When freshly killed fowl are exposed to 68 degrees F., under conditions constant for all birds exposed, the birds drawn according to the method described above show perfect keeping qualities, while the undrawn fowl undergo a rapid process of decomposition. Under

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[1] Annual Report, Massachusetts State Board of Health, 1907, pp. 335, 336.

these conditions the ordinarily drawn birds show fair keeping qualities, although they are not free from bacterial decomposition.

It may be concluded, therefore, from these results, that it is best to draw fowl in a different manner from that usually followed before they are placed in cold storage. After removal from cold storage, the fowl should never be contaminated by soaking in water, but should thaw in the air. Ordinary drawing is worse by far than no drawing at all.[1]

The testimony of Dr. William C. Woodward, health officer of the District of Columbia, may also be cited in support of the conclusion that poultry should not be drawn when it is to be placed in cold storage. Before a congressional committee on Food Storage and Prices, for the District of Columbia, Dr. Woodward testified as follows: —

Dr. Woodward. Certain experiments that were made at the health department some years ago, to determine the effect of drawing poultry upon its keeping properties, indicated that undrawn poultry kept better than poultry that was drawn, with, however, possibly this qualification, that poultry that is not to be drawn should be deprived of food for a certain length of time prior to slaughter. If the entrails are substantially, or to a considerable degree, empty, then the fowl seems to keep better without drawing than it does if it is drawn. The explanation, I think, is probably that the drawn poultry is more or less contaminated in the ordinary process of drawing at what may be termed a "poultry slaughter-house," and the cut surfaces, the interior surfaces of the body cavities and the points where the incisions are made for the purpose of drawing, permit a greater degree of decomposition than does the surface which is largely protected by the skin.

The Chairman. That is to say, the danger of infection —

Dr. Woodward. The danger of putrefaction would be greater in a drawn bird.

The Chairman. Yes; because of the abrasions and cuts.

Dr. Woodward. Yes; and the fouling of the lining and membranes of the abdominal and thoracic cavities.

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[1] Annual Report, Massachusetts State Board of Health, 1907, pp. 282, 283.

The Chairman. We have received a number of letters from people complaining of the retention of the entrails, the excrement, in the bodies of the fowls during the period of storage. They say that fowls are put in storage with the head, the feet, the entrails and other parts that are not altogether agreeable to the taste or smell, and that it has a deleterious effect upon the meat. I want to get your expert opinion as to the effect.

Dr. Woodward. We have never been able to find any evidence that the presence of the viscera and their contents was deleterious.[1]

Legislation against Undrawn Refrigerated Poultry.

It is surprising, in view of the overwhelming testimony with respect to the superior keeping quality of undrawn poultry when placed in cold storage, and the serious dangers of deterioration in drawn fowl, that two States should have passed laws prohibiting the sale of refrigerated undrawn poultry. These States are Delaware and Kansas. The secretary of the Kansas State Board of Health, Dr. S. J. Crumbine, in reply to an inquiry with respect to the working of this prohibition, states that the Board has construed the law to apply only to the retail sale to consumers within the State, thus practically nullifying the statute so far as the wholesale trade and shipments outside the State are concerned. He states that two of the largest poultry packing plants in the United States are situated in Kansas, and that they pack all their poultry undrawn. They sell none of it in Kansas, however, and declare that they would be unable to continue their business if they were not permitted to store undrawn poultry. Dr. Crumbine comments further on the situation, as follows: —

I admit that, in the absence of any large cities in the State, the problem presented to us would not be such as would obtain in populous, nonproducing centers. We have very little difficulty in this State in getting fresh poultry the year round; and there is but little game or fish on the Kansas markets, excepting the large fish that usually comes properly dressed from coast points.

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[1] Report of Subcommittee on Food Storage and Prices, District of Columbia, pp. 103, 104.

There has been no effort to repeal the law, as a reasonable interpretation has been placed upon its provisions, and, as indicated above, our conditions are such as to make it comparatively easy of enforcement.

It is true that considerable research has been made since the passage of the act, which would seem to indicate that the undrawn poultry will keep in refrigeration better than that which is drawn, although in either instance I believe that the results obtained must be chiefly due to the proper slaughtering and handling of the product before being put in refrigeration.

I confess that, if I was to write such a bill for presentation to the Legislature at the present time, I would require only that refrigerated poultry, game and fish, whether drawn or undrawn, should be kept in a frozen state until delivered to the consumer. If that is done, then the danger which constantly confronts the user of cold-storage poultry, game and fish, bought through the average retail market, would be eliminated.

The Delaware act containing the prohibition of the sale of undrawn refrigerated poultry has been in operation only since April 19, 1911, and it has not been possible to secure from the health authorities of that State any information with respect to the working of the provision.

Scientific Experiments with Cold-storage Products.

It will be of interest in this connection to present briefly the results of experiments conducted by experts of the United States Department of Agriculture with respect to the effects of cold storage upon different food products.

The tests that are employed in the scientific examination of cold-storage foods are of four kinds, namely: first, bacteriological — to determine the presence of bacteria, the kind of bacteria, if present, and the effect of cold storage on the future growth or destruction of the germs; second, chemical

— to determine the nature and extent of chemical changes occurring during cold storage; third, histological — to discover changes in the construction of the tissues of the flesh, if any, taking place during cold storage; fourth, organoleptic — to ascertain changes in color, odor, taste, tenderness and the like, which are apparent to the senses.

The first three considerations are within the realm of the scientist only, to the extent of proving from a scientific standpoint that certain changes may or may not take place, and what these changes are, from either the bacteriological, chemical or histological standpoint.

On the other hand, the fourth test above mentioned, the organoleptic, is entirely within the jurisdiction of the practical man in any industry, and constitutes the practical test which has been applied to food products by the men engaged in the business since the inception of the industries. Under this practical test, conclusions can be made just as satisfactorily as from a scientific standpoint. In other words, the fact that changes take place is within the observation of the practical man as well as the scientist, except that the practical man does not know the scientific nature of these changes. The scientist, or any one else, in order to learn the reasons for the changes which he may find take place, must invariably look to the conditions surrounding the product and to the practical men in the industry. On the other hand, the practical man, being in touch with all the conditions surrounding the industry and applying the practical test, always has been in a better position to judge his products from every standpoint than the scientist, who is not familiar with the industry. Only when the scientist combines his actual scientific work with field work in any industry (that is, actually places himself in touch with all the practical conditions surrounding the industry) is he in a position to give a well-rounded up and well-grounded opinion.[1]

Poultry. — Dr. M. E. Pennington, chief of the research laboratory, who is directing the investigations, gave an interesting account of their origin and progress in a statement contained in a pamphlet prepared for the Senate Committee on Wages and Prices of Commodities in 1910. She wrote: —

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[1] Hearings, United States Senate Committee on Manufactures, 1911, pp. 127, 128.

> The investigation of the condition of poultry after varying lengths of storage was really called into being by statements made at a hearing before the aldermen of Chicago, on the length of time poultry was held. A number of cold-storage warehousemen appeared before that committee and stated that poultry would keep in the freezer in good order from one to four years at least. Certain of these gentlemen stated that it could not at the expiration of that time be distinguished from fresh. If such statements were accurate a very important and interesting problem, from both the industrial and the scientific standpoint, was before us.
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> We, therefore, procured from various warehouses poultry which had been in their freezers from one to three years. We had no history of this poultry previous to its entering the warehouse. We were aware of the conditions under which it had been carried in storage, and the thawing after it came out of the warehouse was done in the laboratory. Analyses were made immediately after thawing, which when done in cold air — not water — requires about twenty-four hours. Widely varying results were obtained. Some of the poultry compared, so far as chemical analysis and bacteriological findings indicated, very favorably with the fresh. Other samples showed a wide divergence from the standard.
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> The appearance of the poultry stored for a year or less was, in most cases, better than that stored for longer periods; but sometimes even this index of quality varied, and birds held for longer periods were apparently in better condition.
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> The findings of bacteria in the muscles were estimated, and while the findings agreed with the chemical analysis in indicating when a bird was not fresh, they did not always agree with the length of time that the material had been stored.
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> The histological examination of the muscle tissues showed gradual changes from length of storage more definitely than did any other scientific method. On the whole, however, the indications pointed very strongly to the necessity of knowing what happened to the poultry before it went into the freezer. Apparently the condition in stored birds was dependent upon more than freezing and carrying

frozen. Accordingly, the investigation was extended so that it included the handling of poultry and of eggs from producer to consumer. . . .

Our work leads us to believe that good condition when removed from storage is more closely dependent upon the condition of the goods entering a warehouse than upon the time they will remain there. If they are properly prepared for storage they will keep much longer than when they enter in bad condition, or when the mode of dressing selected does not adapt itself to storage in a frozen condition. For instance, poultry should be dry-picked to obtain the best results, rather than scalded. The animal heat should also be removed by dry cold air, rather than water or ice. These principles apply to the extension of the keeping quality of chickens under any circumstances, but their results are particularly noticeable when cold storage is a part of their history. . . .

We have found, also, that certain kinds of packages tend to preserve cold-stored chickens, and other kinds are detrimental. It is the custom in many places to pack poultry for storage in large barrels holding approximately 250 pounds or even more. The size of this package means that the freezing of its central portions is greatly slowed. The weight of the birds themselves tends to cause decomposition, and the dirt from heads and feet is a frequent source of pollution, bad odors and bad flavors when the eating time comes.

The small package, holding one dozen fowls, has been adopted by many, and is to be encouraged. Even better than this is the carton package holding one or two chickens, which freeze easily and which can be given to the consumer without handling by the middleman. Such packages are sufficiently attractive in appearance for any housewife to purchase in a frozen condition, if she is unprejudiced and understands that, with our modern demand for goods out of season, she must at certain times of the year buy cold-stored products or else do without. . . .

It may be stated as a general principle that chickens properly prepared for storage and properly stored at temperature not above 15 degrees F. cannot be distinguished by eating quality at the expiration of three months. At the expiration of this period the most careful laboratory methods in bacteriology, chemistry and histology show changes which are just discernible, but which, from the practical standpoint, can be disregarded. At the end of six months, if cooked side by side with a fresh chicken and tasted carefully, the trained observer can generally detect a difference. The laboratory at this time shows a sharper difference in chemical composition. But we have not, up to the present time, determined that this difference indicates any unwholesomeness of the flesh.

At the end of nine months the flesh has become dirty, slightly shredded, and both gastronomic and laboratory differences have become more apparent. The same may be said at the end of twelve months, and if the birds, well-stored, are to be a credit to the industry, it would seem desirable that they be consumed before the twelfth month, if possible.

These statements apply to chickens well dressed and packed with storage in view. If the stock reaches the freezer in imperfect condition, no matter what the cause may be, it is quite certain that it will not keep as long as good stock. How long it will keep depends entirely upon what it is when it enters the freezer.[1]

The results of a preliminary study of the effects of cold storage on chickens are summed up by Dr. Pennington in a pamphlet issued by the Department of Agriculture in 1908, as follows: —

(1) Microscopic observations of fresh and cold-stored chickens show that certain plainly visible differences exist between the two classes, which differences are progressive, depending on the length of the storage period.

(2) Chemical analyses of fresh and cold-stored chickens, wherein were determined the total nitrogen for both dark and light meat, and its distribution between the classes of compounds commonly accepted as the result of protein hydrolysis, the various values from which a knowledge of the composition of fat may be obtained, and such minor constituents as water, ash, etc., have served to show that for the protein distribution there is a slight variation in the cold-stored product from the fresh, and for the fat values a wide variation.

(3) A histological examination of the muscles of both fresh and cold-stored chickens shows a marked and progressive change in the structure of the fibers which is deep-seated, and after long periods renders the tissues almost unrecognizable. Selective microchemical

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[1] "Use of Cold Storage," Senate Document, 486, 61st Congress, 2d Session, 1910, pp. 19, 21, 22.

differentiation of the tissues confirms the chemical change found by gross analytical methods.

(4) A bacteriological examination of fresh and cold-stored chickens reveals the presence of appreciable numbers of organisms, calculated on the gram basis, in the edible portions of those preserved by cold, though the numbers were not large. In fresh fowls the same technique gave no bacterial growth.

In reviewing the details of this preliminary work it must be remembered that some of the inferences drawn may be modified by future investigations, although the fact that certain changes take place in the food materials examined after definite periods of storage is well established both by the organoleptic and by the chemico-bacteriological tests, and is further confirmed, in the case of the chickens examined, by the histological studies.

The general results of the organoleptic tests of the stored fowls and birds lead to the conclusion, first, that even after three months, before cooking, it is not difficult to distinguish, by the appearance, color and odor, a freshly killed bird from the one that has been in cold storage. The shriveled condition of the eye and the skin, and the generally dilapidated appearance of the bird, are very significant and distinct. After cooking, however, within a period of three months, there is much disagreement on the part of the jurors respecting the proper classification thereof. . . . At later dates, such as at the end of six months, nine months or twelve months, the difference between the birds becomes more and more pronounced, so that it may with certainty be said that even after cooking one would rarely confound a fresh bird with one which had been in storage six months. At that date the flavor and the general character of the meat have so deteriorated that it is not difficult to distinguish between the fresh and the stored fowl. . . . At the end of a year or more it would be quite impossible to make a mistake in most cases between the fresh and the stored birds.

Summing up the organoleptic properties, it may be said that for a short time, possibly six weeks, or even longer, there is no perceptible change produced in a chicken by having it frozen. There certainly does not seem to be any evidence that it is better, and there is no convincing evidence that it is any worse. After three months, however, the fresh chicken is easily distinguished by its properties, as a rule, from the cold-storage chicken, even after cooking, and to an absolute certainty before cooking. This distinction between the fresh and the stored bird becomes more and more marked as the time of storage increases. . . .

The general conclusion is, therefore, that in the case of frozen birds there is no indication of any improvement in quality, that is, in taste, odor or flavor, during cold storage. There is a deterioration which is noticeable, even at the end of three months, and becomes more marked as the time of storage grows longer. Hence, without any reference whatever to the question of wholesomeness, cold storage prolonged for six months or more appears to be distinctly detrimental as far as taste, flavor and palatability are concerned.[1]

Quail. — The experiments with cold-storage quail show results very different from those with chickens. The reason would appear to be that the quail are mutilated by shot before going into storage, with the result that deterioration proceeds more rapidly than in properly slaughtered poultry, and in a different manner. It appears that both drawn and undrawn quail have inferior keeping qualities, as compared with poultry, and that the drawn birds keep better than the undrawn. The investigation would appear to a layman to indicate that quail or small game birds in general should not be kept in cold storage longer than a few weeks.

The significant results of the investigation are embodied in these extracts from the report of the Department of Agriculture: —

After three months' storage no deterioration was noted and no distinction could be made between the drawn and the undrawn bird. The flavor was still sweet, though the birds were perhaps somewhat drier. After eight and one-half months in cold storage the fresh bird was distinguished from the others without difficulty by all of the jurors, and in practically all of the cases the undrawn birds were declared to be already marked by stronger taste and odor. It is, of course, understood that these birds were designated by numbers, and the jurors recorded their opinion independently and without any knowledge of the identity of the birds.

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[1] "Effects of Cold Storage on Eggs, Quail and Chickens," Bulletin No. 115, 1908, pp. 98-100.

After about one year in storage the difference between the fresh and the cold-storage birds was again marked, though the drawn cold-storage bird is rated uniformly as second best, and is tasteless rather than strong, while the undrawn birds were recorded as bad or strong, as to either taste or odor, in practically every case, though the larger undrawn bird is recorded in two cases as superior to the small, and of good flavor. There can be no doubt but that after eight months of storage the birds were markedly inferior to the fresh ones, when simply cooked and seasoned, and in nearly all cases the deterioration of the undrawn bird is much more marked than that of the drawn one, in so far as the odor and flavor can testify. . . .

The first examination was made when the quail had been in storage for three months. The external appearance of both the drawn and undrawn quail was good. The body, however, was altered from shape from pressure while in the case. The undrawn was the better looking of the two. Both birds had a peculiar odor, not very strong but suggestive of rancid fat, which was more pronounced in the undrawn than in the drawn. Several small areas on the breast muscle showed evidences of desiccation, and in the drawn quail this muscle showed shot wounds, which were surrounded by a bloody exudate. The fibers of the muscle were brittle. The viscera of the undrawn bird were in fairly good condition. A small amount of a dark extravasated bloody effusion was found in the abdominal portion of the body. There were no gas bubbles and no discoloration except where the liver came in contact with the parietal walls. . . .

The second examination of quail preserved by cold was made after a storage period of eight and one-half months. In both birds the odor was suggestive of rancid fat. In the undrawn bird, however, there was a distinct fecal odor in addition. The region of the vent in both birds was darkened in color, with rather a greenish tint in the undrawn. The muscles of both birds cut very readily.

The abdominal cavity of the undrawn bird contained about 10 cubic centimeters of a bloody serous fluid; the kidneys were dark and congested; the intestines of a dull gray color, not at all attractive in appearance. There was also a noticeable odor of putrefaction when the abdominal cavity was first opened. The membranous lining of this cavity had a slimy appearance and a greenish-yellowish tinge.

In the drawn bird the thoracic portion of the cavity was in very good condition, but the posterior region was abnormal both in appearance and odor. The lining membrane, particularly in the region of the vent, was infiltrated with a slimy, bloody fluid. . . .

The next examination was made when the quail had been in storage for eleven and one-half months. The general external appearance of both the drawn and the undrawn bird was bad. The body was distorted in form, and broken bones were noticed in both cases. The muscles were shriveled and the region of the vent was distinctly sunken, varying in color from green to brown-black, and the discoloration extending well into the tissues of the inner side of the leg. The skin was parchmentlike. All of these conditions were more pronounced in the undrawn than in the drawn quail. The odor was putrefactive, rancid and fecal for the undrawn, and distinctly rancid for the drawn.

The muscles of the drawn bird were in better condition than were those of the undrawn. The texture of the latter was flabby and without elasticity.

In the undrawn bird the abdominal cavity showed the presence of mites. The heart was in fair condition. All the other organs were in exceedingly bad condition, the liver, for instance, being soft, light green or yellow, and much degenerated. The kidneys were dry and friable, varying from gray to yellow-brown. The intestines were green, the folds being matted together in masses, without any distinctive outlines of demarcation, and the walls so thin that they broke even when lightly touched. This condition grew worse toward the vent. . . .

It will be observed from even the small number of birds examined and here listed that the problem becomes even more complicated than in the case of the chickens, because the method of killing is almost certain to introduce bacteria which may be carried into the deeper tissues, and, as in the case here noted, result in the rupturing of the intestines and the entire pollution of the body cavity. The prompt dressing and cooking of birds so injured would render this factor unimportant. If, on the other hand, the birds are exposed for sale for a number of days before being disposed of, or, being unsold, are, at the expiration of such a time, transferred to cold storage, the condition may be menacing. It would seem in the case of quail, even more than chicken, most desirable that a very prompt transference to the storage warehouse be made, or that the birds be dressed and sterilized by heat as soon as possible after killing.[1]

Eggs. — The following observations on the keeping of eggs are contributed by the food research laboratory, in a pamphlet on the use of cold storage, prepared by Dr. Harvey W. Wiley for the Senate Committee on Wages and Prices of Commodities.

Fresh unfertilized eggs laid early in the season are the best keepers. It is difficult to distinguish these eggs from the fresh by taste alone at the end of eight months, the eggs having been soft boiled for three minutes and tasted without the addition of butter and salt. For ordinary cooking purposes, such as omelets, frying, etc., they are not to be distinguished by the taste from a fresh egg.

Fertilized eggs stored within forty-eight hours after laying can be kept almost but not quite as well as the unfertilized, determined by the flavor of the eggs soft boiled. High-grade eggs commercially fresh keep well to nine months. Between six and nine months, however, a peculiar taste, which has been designated "storage taste," is apt to develop. This is apt to throw the egg out of the soft-boiling class, but it is available for other culinary purposes. The higher the quality of the egg when it goes into storage, the longer it can be held in good condition. It has been found that eggs which had begun to deteriorate went down more rapidly in storage than those which were put in in first-class order.

Chemical analysis shows that there is a change in the composition of the fat in the yolk of the storage egg. The yolk also contains more water when it is stale than when it is fresh. The white of the egg loses water. There is also evidence of the protein of the white of the egg as the egg ages. Animo bodies which do not exist in the white of the fresh egg are found as the egg becomes stale. The appearance of a stored egg before a candle generally shows a yolk which is slightly more opaque than the fresh egg, and which shows a tendency to sink to the bottom of the egg. Long storage may cause the yolk to adhere to the shell. The opacity and sinking of the yolk of the egg, which occurs during long storage at low temperature, is comparable with the early deterioration of the egg kept at ordinary temperatures. Fresh eggs are found to be practically sterile, and keep so for nine months at a temperature of from 30 degrees to 32 degrees F., which prevents the increase of the organisms. Storage at this temperature, however, does not cause any practical decrease in the number of organisms present in the stale or contaminated egg. The vitelline membrane is tender and is easily ruptured. This makes it difficult to separate white and yolk in eggs of long storage or in stale eggs. The white of a fresh-laid egg, laid by a well-fed hen, is a firm viscous body, having a layer under the shell which is slightly thinner than the rest of the substance. As the egg becomes stale, the white becomes thinner, or, in the phraseology of the trade, "does not stand up well." On long storage the same thing happens slowly if the egg is in good condition when going into storage; more rapidly if the egg is of lower quality.[1]

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[1] Bulletin No. 115, pp. 38, 40-43.

The following conclusions with regard to cold-storage eggs are presented in the bulletin of the United States Department of Agriculture, issued in 1908, to which reference has already been made: —

Eggs in storage for one year show a loss of weight equivalent to 10 per cent. of the total weight, which loss is largely water from the whites. Eggs after storage for sixteen and one-half months lose their power of cohesion and emit a characteristic musty odor a few hours after opening. A lowering of the amount of coagulable proteid of the boiled sample is indicated, as well as a change in reaction and a lower percentage of lecithin phosphorus in the storage eggs. An increase in the lower nitrogen bodies, proteoses and peptones accompanies the decrease of coagulable nitrogen in the boiled samples of storage eggs, while there is apparently a tendency for the amido bodies to decrease.[2]

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[1] Senate Document No. 486, 61st Congress, 2d Session, pp. 11, 12.

[2] Bulletin No. 115, p. 30.

The first eggs examined in the cold-storage experiment were six fresh eggs. These were normal when examined May 24, 1906, and it was stated that the eggs were laid the day before. The next examination was made on a withdrawal of four eggs from storage, September 7, 3.6 months later, and nothing abnormal was noted, the same being true of the withdrawal of Jan. 7, 1907. Another examination was made of the June, 1907, withdrawal, representing a storage period of 12.6 months. At this time two eggs were examined and appeared in general to be normal eggs, but in the yolks were found small rosette crystals. It seemed that they were most frequently found in the outer portion of the yolk. In one egg they were of very rare occurrence. This was the first appearance of these forms, and they figured later in the description of the samples of the withdrawal of October, 1907, the last examination made. At this time the entire white of the egg looked watery; the part next to the yolk, although denser than the outer part, had deteriorated. The shell membrane appeared microscopically normal, as well as the vitelline membrane. The yolk assumed a much flattened form after removal from the shell and did not retain the spherical shape of a fresh egg, but in all cases was distinct from the albumen. In addition to the normal yolk elements, rosette crystals were found in the yolk.[1]

Butter. — The investigations on the subject of butter and cheese, conducted by experts of the Department of Agriculture, are mainly technical, relating to the keeping qualities of these commodities under different conditions of temperature and handling.[2] The results have very little significance for the purpose of any inquiry into the general effects of cold storage on health. It is generally admitted that butter and cheese do not undergo such a degree of deterioration in cold storage as to involve danger to the public health. Dr. L. A. Rogers, in charge of the laboratory of the dairy division of the Bureau of Animal Industry, testified before the Senate Committee on Manufactures with reference to the results of his experiments concerning the effects of cold storage on butter. He explained: —

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[1] Bulletin No. 115, pp. 36, 37.

[2] See Bulletin No. 83, Bureau of Animal Industry, United States Department of Agriculture, "The Cold Storage of Cheese," by Clarence B. Lane, B.S., 1906; Bulletin No. 84, Bureau of Animal Industry, United States Department of Agriculture, "The Keeping of Butter made under Different Conditions and stored under Different Temperatures," by C. E. Gray, 1906.

> Our work has been carried on largely by the manufacturers of experimental butter under conditions where we could control the manufacture of butter and the storage of butter in regard to handling and temperature, and carry on our chemical and bacteriological investigations at the same time. That is, we have a field laboratory where we have the laboratory, I should say, in connection with the creameries, so we can make our butter under controlled conditions and begin our bacteriological and chemical examination with the fresh butter. We also have storage rooms in Chicago which can be managed by any temperature we desire, where the butter is stored. It is usually brought to Washington for chemical and bacteriological examination after storage. . . .
>
> There are two things in butter which may change, that is, the nitrogenous constituents and the fat. Now, in any butter made in ordinary ways the change in the nitrogenous part of the butter is very slight indeed, so slight that it is difficult to detect it. That is especially true of the butter made in the larger creameries, in which the cream is usually pasteurized. In farm butter — a butter made from unpasteurized cream — the change in the nitrogenous condition may be palatable, but still very slight. The same is true also of fat. The fat may change so slightly that it is almost impossible to detect it, even after a month in storage, or it may change very much indeed. For instance, in the grade that is known as "packing stock" you usually find a large amount of free acid, which has come from the decomposition of the fat.[1]

Dr. Rogers testified that butter which was in good condition when in cold storage, and properly kept there, would be wholesome in the sense that it would not be injurious to health at the end of twelve months. He added: "I doubt if butter would ever become injurious to health, except that it might cause nausea, owing to the bad taste, but not in the sense that it would become toxic or poisonous." He expressed the further opinion that so far as health is concerned there is no limit to the period during which butter may be kept in cold storage. He admitted that butter might go off in flavor during cold storage, but he had never heard of any person being injured in health by eating cold-storage butter.[1]

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[1] Hearings, United States Senate Committee on Manufactures, 1911, pp. 78, 79.

Conclusions as to Effects of Cold Storage on Food Products.

A review of the available information bearing on the question of the effects of cold storage on food products appears to warrant the following conclusions: —

1. A progressive deterioration takes place in perishable food products kept in cold storage; the changes naturally occurring are greatly retarded by refrigeration, but are not absolutely suspended. Therefore, a food product that has been held in cold storage is never just as good as the perfectly fresh article, other conditions being equal.

2. The deterioration taking place during cold storage first appears in a change in flavor, which may affect the palatability of the food, but does not necessarily affect its wholesomeness or nutritive value.

3. The length of time during which an article of food (held in cold storage) can be kept wholesome and fit for consumption varies for different commodities.

4. The period of proper preservation for any particular commodity depends largely on the methods of handling and preparing for cold storage.

5. Scientific investigation in this field has not yet been carried far enough to enable one to fix normal time limits of cold storage for different commodities.

6. On the whole, prolongation of cold storage beyond one year, even under correct conditions, appears to be undesirable, and prejudicial to public health.

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[1] Hearings, United States Senate Committee on Manufactures, 1911, pp. 79, 80.

2. INFLUENCE OF COLD STORAGE ON PRICES.

The subject of the influence of cold storage on prices has been much debated. On the one hand, the charge has been made that cold storage has operated to increase prices. The contention of those who make this charge is that cold storage enables dealers to withdraw supplies from the market, and thus to advance prices. In particular, cold storage has been attacked as one of the causes of the recent advance of prices, which began in 1897. This accusation has been reiterated in the daily press, both in news dispatches and in editorial discussions of the causes of the high cost of living. Occasionally, also, some dealer expresses the opinion that the tendency of cold storage is to make prices higher. Mr. Frank Tilford of the firm of Park & Tilford, of New York city, stated before the United States Senate Committee on Wages and Prices of Commodities in 1910, that the effect of cold storage is to increase prices. In this connection he testified as follows: —

The CHAIRMAN. I want to ask you, Mr. Tilford, if you think that cold storage affects prices at all?

Mr. TILFORD. Yes, sir; I believe it does, sir.

The CHAIRMAN. It enables them to hold goods?

Mr. TILFORD. Yes, sir.

Senator JOHNSTON. You mean it affects them by increasing the price?

Mr. TILFORD. I do; yes, sir.

Senator CRAWFORD. What class of goods?

Mr. TILFORD. Butter and eggs.

Senator CRAWFORD. Can they get such a large supply of butter and eggs on hand in these storage houses that by holding the supply thus gathered, and keeping it off of the market, they can stimulate the price upward; you think they do that in some cases?

Mr. TILFORD. I think they do; yes, sir. I think that is a very important factor, very important.

Senator CRAWFORD. You think that they can do that with meat products?

Mr. TILFORD. I think they can; I am not so familiar with meat products. I think that is a very important matter.[1]

The opinion that cold storage raises prices is held by Dr. Harvey W. Wiley, chief of the Bureau of Chemistry of the United States Department of Agriculture. In a communication to this commission, under date of Nov. 7, 1911, he states: —

I realize that cold storage must of necessity increase the prices of food to the consumer, because the consumer must not only pay for the foods, but also pay all storage charges.

On the other hand, it is claimed by representatives of the cold-storage business, and by others who have investigated this subject, that cold storage lowers prices, and also makes them steadier. It is contended that cold storage has brought about a larger volume of production in the case of perishable foodstuffs by extending the period during which they can be marketed. Before the advent of cold storage, it is pointed out, producers of perishable foodstuffs were obliged to dispose of the entire output during a few months of the year; the development of cold storage has made it possible to distribute the sale of these products over the entire year, and thus to dispose of a much larger quantity than would otherwise be possible. If cold storage were done away with, it is argued, producers would be obliged to curtail greatly the present volume of output, and a higher level of prices would be the result. Mr. C. S. Mead, secretary of the Merchants' Association of New York city, states this argument as follows: —

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[1] Senate Document No. 847, 1910, Vol. 3, p. 809.

Through the development of the cold-storage system the aggregate available supply of food products of certain classes is materially increased beyond what it would otherwise be, for the reason that such preservation enables that part of the supply in excess of the powers of consumption at the time of production to be carried over and made available at periods when there is little or no natural supply. If it were not for this artificial means of preservation, the producers of many perishable products would be forced to limit their output to the quantity that could be profitably sold for immediate consumption. The ability to accumulate during periods of maximum output enables the producer to increase his product, and thereby confers an important economic benefit not only upon such producer, by enabling him to obtain a fair average price, and by permitting larger transactions, but also on the whole body of consumers by promoting a larger production and more uniform prices. No conclusive reason has been shown why this economic benefit, which tends to increase the world's food supply and to decrease its cost, should arbitrarily and unreasonably be restricted.[1]

It is further argued that cold storage, by enabling dealers to carry over the surplus of the season of abundant production to meet the scarcity of the season of short production, tends to equalize prices; it brings about a better adaptation of supply to demand by distributing the output of perishable foodstuffs more evenly over the market year. The withdrawal of goods from the market to be placed in cold storage in the time of plenty prevents prices from falling so low as they otherwise would, and the return of such goods to the market in time of scarcity checks the rise of prices at that time. The working of cold storage in this respect has been stated by a representative of the business as follows: —

Before cold-storage facilities were available, during the time of plenty prices were extremely low for the producer. Conversely, during the season of scarcity prices rose rapidly, and were extremely high to the consumer. Many classes of perishable products were not procurable, even at the extreme prices. The cold-storage warehouse acts as a balance. It insures that a fair supply of the products of plenty, produced in their seasons, shall be available throughout the year. It materially lessens the extreme between the former minimum and maximum selling prices, which is a decided advantage to both producer and consumer.[1]

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[1] Report, United States Senate Committee on Manufactures, 1910, p. 43.

Difficulties of Problem.

It is impossible to make definite and conclusive statements with respect to the effect of cold storage on prices. Many factors enter into the determination of prices, and it is not practicable to isolate one factor, such as cold storage, and measure its influence exactly. The question is complicated by the recent advance of prices, which has been brought about by a multiplicity of causes. The United States Senate Committee on Wages and Prices of Commodities, 1910, specified fifteen different causes of the upward movement of prices in recent years. Among these cold storage was listed; the committee expressed the opinion that cold storage "prevents extreme fluctuations of the prices of said commodities with the seasons, but enables the wholesalers to buy and sell at the best possible advantage, and thus tends to advance prices." The Massachusetts Commission on the Cost of Living, 1910, enumerated eight general causes of the recent advance of prices, among which cold storage was not included. This commission expressed the opinion that cold storage, instead of tending to raise prices, makes them lower and steadier, by increasing the production of perishable commodities and preventing extreme fluctuations of price, either upward or downward.

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[1] Report, Massachusetts Commission on the Cost of Living, 1910, p. 179.

Decades 1881–90 and 1901–10 selected for Comparison.

While accurate statistical measurements regarding the effect of cold storage on prices cannot be made, some general inferences can be drawn from a comparison of the movement of prices before and after the introduction of cold storage. For the purpose of such a comparison the decades 1881–90 and 1901–10 may be taken. Prior to 1890 cold storage was not used to any considerable extent. A limited amount of cold-storage facilities was available during the closing years of the earlier decade, but hardly enough to have an appreciable effect upon prices. It was about the year 1890 that mechanical refrigeration was first employed. During the decade 1901–10 cold storage was in general use, and this period may be taken as representative of present conditions, while the decade 1881–90 may be taken as representative of conditions that preceded the introduction of cold storage.

Receipts of Butter, Eggs and Poultry in the City of Boston, by Years, for the Decade 1881–90 and the Decade 1901–10.

Year.	Population.		Per Cent. Increase of Population.	Receipts.					
				Butter.				Eggs.	
				1881-90.		1901-10.		1881-90.	
	1881-90.	1901-10.		Pounds.	Per Capita.	Pounds.	Per Capita.	30-Dozen Cases.	Per Capita.
1,	368,350	567,626	54.10	18,811,140	51.1	40,244,960	70.9	420,087	1.14
2,	373,861	574,439	53.65	17,401,250	46.5	37,607,850	65.5	502,247	1.34
3,	379,372	581,337	53.24	20,336,170	53.6	37,028,125	63.7	520,256	1.37
4,	384,883	588,317	52.86	19,364,465	50.3	37,358,650	63.5	595,383	1.55
5,	390,393	595,380	52.51	20,596,685	52.8	43,166,485	72.5	619,367	1.59
6,	402,010	609,966	51.73	22,602,435	56.2	39,178,570	64.2	743,096	1.85
7,	413,627	624,910	51.08	23,393,385	56.6	36,900,040	59.0	835,717	2.02
8,	425,244	640,220	50.55	25,187,605	59.2	38,922,845	60.8	891,351	2.09
9,	436,861	655,905	50.14	27,846,425	63.7	36,389,605	55.5	1,054,286	2.41
10,	448,477	670,585	49.52	28,349,285	63.2	38,326,520	57.2	1,247,431	2.78
Average,	–	–	51.93	22,388,884	55.3	38,512,365	63.2	742,922	1.81

Receipts of Butter, Eggs and Poultry in the City of Boston, by Years, for the Decade 1881–90 and the Decade 1901–10 — Concluded.

Year.	Receipts — Con.						Per Cent. Increase of Receipts.		
	Eggs — Con.		Poultry.						
	1901-10.		1881-90.		1901-10.				
	30-Dozen Cases.	Per Capita.	65-Pound Packages.	Per Capita.	65-Pound Packages.	Per Capita.	Butter.	Eggs.	Poultry.
1,	1,040,555	1.83	46,093	.125	319,129	.562	113.94	147.70	692.36
2,	1,053,165	1.83	48,247	.129	316,319	.551	116.12	109.69	555.62
3,	1,164,777	2.00	45,744	.121	278,586	.479	82.08	111.94	509.21
4,	1,122,819	1.91	47,965	.125	298,082	.507	92.92	88.59	521.46
5,	1,395,385	2.34	65,068	.167	302,785	.509	109.58	125.29	365.33
6,	1,709,531	2.80	66,793	.166	412,959	.677	73.34	130.06	518.27
7,	1,594,576	2.55	101,244	.245	380,396	.609	57.74	90.80	275.72
8,	1,436,786	2.24	90,425	.213	352,381	.550	64.53	61.19	289.69
9,	1,417,397	2.16	89,575	.205	339,114	.517	30.68	34.44	278.58
10,	1,431,686	2.13	102,113	.228	371,431	.554	35.19	14.77	263.75
Average,	1,336,667	2.17	70,328	.172	337,117	.551	76.61	91.44	418.99

Volume of Production in Two Decades.

Some indication of the volume of production in the two decades may be gained from the statistics of receipts of eggs, butter and poultry in the city of Boston. These statistics are presented in the tables on pages 71 and 72, showing (1) the total receipts of these commodities for each year in the two decades, (2) the per capita receipts, and (3) the percentage of increase of receipts in the second decade as compared with the first.

A comparison of the receipts for the two periods shows that the annual per capita receipts of the three commodities were greater in each year of the decade 1901–10 than in the corresponding year of the decade of 1881–90, except in the years 1909 and 1910 in the case of eggs and butter, when the receipts show a slight falling off as compared with the figures for the earlier decade. The average per capita receipts of the three commodities were much greater in the second decade than in the first, the figures being as follows: butter, 63.2, as compared with 55.3; eggs, 2.17 and 1.81; poultry, .551 and .172. It thus appears that there has been a notable increase of the amount of these perishable food products brought into the Boston market in the ten years during which cold storage has been generally utilized, as compared with the amount received in the earlier period, during which cold storage had not been introduced to any appreciable extent. It is a reasonable inference from these statistics that cold storage has contributed to increase the supply of these products available for consumption.

A study of the receipts of these commodities in New York city shows similar results. Tables of receipts of eggs submitted for the use of the Senate Committee on Manufactures by Mr. F. G. Urner of New York city show that the increase in egg receipts at New York during the period

1900–10, as compared with the period 1880–90, was far greater in percentage than the increase in population.[1] A large increase in per capita consumption is shown during the latter period. Figures for receipts of butter in New York city, presented by the same authority, indicate a smaller consumption of butter per capita during the period 1900–10 than during the years 1880–90. This is doubtless to be explained by the fact that during the earlier period, before the introduction of refrigerator transportation at interior New England and northern points, a much larger proportion of New York's receipts was absorbed in the regions thus affected than has been the case since 1900, when these regions have been much more largely supplied directly from the centers of production. It is believed that if this difference in the ultimate destination of New York's receipts of butter could be ascertained, it would appear that the per capita consumption of butter has increased during the last decade, notwithstanding the extension of the consumption of oleomargarine.

On the whole, the statistics of receipts of perishable food products at New York city points clearly to an enlarged volume of production and an increased per capita consumption during the latter decade, as compared with the first. The contention that cold storage has had the effect of enlarging the output and thus increasing the consumption of goods thus preserved, which seems theoretically sound, is sustained by the statistics.

Average Prices in Two Decades.

The effect of increased receipts of these commodities in the Boston and New York markets, other things being equal, must be to lower prices. Of course, this influence might be offset, and doubtless it has in large measure been offset, by counteracting causes, but the fact of increased receipts shown by the statistics, which may reasonably be attributed in some measure to the development of cold-storage facilities, necessarily tends to make prices lower than they would be otherwise.

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[1] Hearings, United States Senate Committee on Manufactures, 1911, p. 140.

The statistics of prices for the three commodities under consideration in the Boston market are more significant in their bearing on this question of the influence of cold storage upon prices than are the figures of receipts. The following table shows the average wholesale prices of butter, eggs and poultry in Boston, by years, for each of the two periods, 1881–90 and 1901–10: —

Average Price (Cents).

Year.	Butter.	Eggs.	Poultry.	Year.	Butter.	Eggs.	Poultry.
1881, .	29.2	21.7	14.9	1901, .	21.7	17.3	9.4
1882,	32.4	23.0	16.6	1902, .	24.0	20.7	11.4
1883,	28.5	21.6	19.0	1903, .	23.2	19.7	13.4
1884,	28.0	21.3	16.4	1904, .	21.7	23.1	13.4
1885,	24.2	18.6	15.8	1905, .	24.4	23.2	14.0
1886,	26.5	17.5	14.2	1906,	24.2	21.9	13.7
1887,	24.2	19.3	13.7	1907,	28.2	21.6	14.5
1888, .	25.0	19.2	14.5	1908, .	27.6	22.7	13.5
1889,	23.6	16.6	14.4	1909, .	29.5	23.1	15.0
1890, .	23.3	18.0	12.8	1910, .	30.3	24.6	15.7
Average,	26.5	19.7	15.2	Average, .	25.5	21.9	13.4

It appears from this table that the average prices of butter and poultry were lower in the second decade than in the first. The average price of butter was 26.5 cents in the first period and 25.5 cents in the second; that of poultry was 15.2 cents in the first period and 13.4 cents in the second. The average price of eggs shows a slight increase in the second period over the first, the figures being 21.9 cents and 19.7 cents, respectively. This increase in the average price of eggs in the later decade as compared with the earlier decade may be explained by certain conditions which would naturally tend to bring about an advance of the price of eggs as compared with butter and poultry. In the first place, there has undoubtedly taken place a great increase in the demand for eggs in the last ten years. The growing demand for egg drinks absorbs an increasing proportion of the supply. This increase in demand would tend to offset any influences in the direction of lower prices. Moreover, the cold-storage egg is a less acceptable substitute for the fresh article than is cold-storage butter or poultry. There is a large demand for strictly fresh eggs which is not met by the cold-storage product. The existence of this persistent demand for the fresh article keeps the price of the latter above the level which would be established if the cold-storage supply were as effective in lowering prices during the period of scarcity in the case of eggs as it is in the case of butter and poultry. Furthermore, there is absolutely no substitute for the egg as an article of consumption, whereas in the case of butter and poultry such substitutes are a large factor in affecting the price movement. If the price of butter rises unduly the consumption of oleomargarine is increased; when fresh-killed fowl is too expensive for the average consumer, fish and meat products come into play to supply the demand that would otherwise call for poultry. Canned chicken is also used extensively. Again, the season of abundant production is somewhat shorter in the case of eggs than in the case of butter and poultry, and the season of extreme scarcity is correspondingly longer. These conditions would seem to account for the fact that the average price of eggs has been higher during the last decade, as compared with the period 1881–90, while the prices of butter and poultry have been lower.

Causes of Recent Advance of Prices.

The lower average of prices for butter and poultry during the ten-year period 1901–10, as compared with the earlier period 1881–90, is very striking in view of the general advance of prices which has taken place during the last decade. Various causes have been at work to bring about a higher level of prices in general during the last decade. The Massachusetts Commission on the Cost of Living attributed this advance primarily to the increase of the gold supply, which has reduced the purchasing power of money and brought about a corresponding increase of values measured in money throughout the commercial world. The commission also found that a complexity of causes had operated on the side of supply to reduce the volume and increase the expenses of production, and on the side of demand to extend and diversify the consumption of commodities. The main factors in restricting supply and enhancing production costs were found to be the drain of population from the land, which had decreased the proportion of persons engaged in producing the food supply; the exhaustion of natural resources which had resulted in increased expenses of production or diminished returns from the soil; and uneconomic methods of production and distribution, especially the latter. The chief influences on the side of demand were stated to be the growing concentration of population in great cities, which had increased the proportion of nonproducing food consumers, and also added to the expense of distributing the food supply; the general advance of the standard of living, which had enlarged the requirements on the part of individual consumers of all classes; and the national habit of extravagance, which had further extended and diversified the demand for commodities, created by the advance of the standard of living. The influence of these causes has been especially potent in relation to the food supply. It appears, however, from the statistics which have been given, that notwithstanding the operation of these causes, the average price of butter and poultry was actually lower in the decade 1901–10 than in the earlier decade 1881–90; while the average price of eggs was only slightly higher.

Cost of Storage a Negligible Factor.

The reasoning of Dr. Wiley that cold storage "must of necessity increase the prices of foods to the consumer, because the consumer must not only pay for the foods but also pay all storage charges," neglects to take account of the effect of cold storage in enlarging the volume of production and thus establishing a lower average level of prices throughout the year, and of carrying the surplus of one season over to meet the scarcity of another season, thus preventing prices from rising unduly in times of short production. While it is true that the cost of storage must be added to prices charged to consumers, it is also true that products bought and stored in time of abundant production can be sold later at lower prices, with the cost of storage included, than fresh goods produced in seasons of scarcity. The cost of storage is so small that it is a factor of little moment in the making of prices. The total cost of carrying eggs in storage from April to January is estimated at only 2 to 2½ cents a dozen, including charge for storage, interest on investment and cost of insurance. This item of expense is practically negligible as against the effect of cold storage in keeping the price of eggs from mounting to great heights in the winter months. The statement of Dr. Wiley, while literally true, is one-sided and misleading.

Seasonal Movement of Prices.

A comparison of the prices of butter and eggs for the periods of flush production and of short supply, respectively, during the two decades discloses further significant facts. The period of flush production for butter covers the months June, July and August; that for eggs the months April, May and June. The period of short supply in both cases may be taken to include the months of November, December and January. The following tables show the average prices for the two periods, by years, during the decades 1881–90 and 1901–10: —

Butter.

1881-90.				1901-10.			
YEAR.	Average Price (Cents), Months of Flush Production: June, July, August.	YEAR.	Average Price (Cents), Months of Short Supply: November, December, January.	YEAR.	Average Price (Cents), Months of Flush Production: June, July, August.	YEAR.	Average Price (Cents), Months of Short Supply: November, December, January.
1881,	22.6	1881–82,	35.6	1901,	20.3	1901–02,	23.6
1882,	26.3	1882–83,	37.3	1902,	21.7	1902–03,	26.1
1883,	22.6	1883–84,	32.6	1903,	20.8	1903–04,	23.5
1884,	22.0	1884–85,	30.0	1904,	18.5	1904–05,	25.0
1885,	19.6	1885–86,	29.0	1905,	21.3	1905–06,	23.6
1886,	19.3	1886–87,	29.0	1906,	20.8	1906–07,	29.3
1887,	21.0	1887–88,	26.6	1907,	25.0	1907–08,	27.1
1888,	20.6	1888–89,	29.0	1908,	23.9	1908–09,	30.3
1889,	18.8	1889–90,	25.0	1909,	26.6	1909–10,	32.6
1890,	17.6	1890–91,	27.0	1910,	28.5	1910–11,	30.0
Average,	21.04		30.1	Average,	22.8		27.1

Eggs.

1881-90.				1901-10.			
YEAR.	Average Price (Cents), Months of Flush Production: June, July, August.	YEAR.	Average Price (Cents), Months of Short Supply: November, December, January.	YEAR.	Average Price (Cents), Months of Flush Production: June, July, August.	YEAR.	Average Price (Cents), Months of Short Supply: November, December, January.
1881, .	15.3	1881–82,	25.6	1901, .	13.0	1901–02,	24.6
1882, .	18.6	1882–83,	28.6	1902, .	16.2	1902–03,	22.6
1883, .	18.0	1883–84,	28.3	1903, .	15.6	1903–04,	30.0
1884, .	16.8	1884–85,	25.0	1904, .	17.6	1904–05,	26.3
1885, .	14.4	1885–86,	23.6	1905, .	17.6	1905–06,	27.3
1886, .	12.2	1886–87,	24.3	1906, .	17.3	1906–07,	30.3
1887, .	14.0	1887–88,	23.0	1907, .	17.3	1907–08,	28.0
1888, .	16.3	1888–89,	22.3	1908, .	16.6	1908–09,	32.3
1889, .	12.6	1889–90,	22.6	1909, .	22.3	1909–10,	29.3
1890, .	14.0	1890–91,	27.0	1910, .	21.6	1910–11,	30.3
Average,	15.2	. .	25.03	Average,	17.8	. . . .	28.1

The tables show that the average price of butter in the period of short supply was materially lower in the second decade than in the first, the figures being 27.1 and 30.1, respectively. On the other hand, the average price during the period of flush production was somewhat higher in the second period than in the first, namely, 22.8, as compared with 21.04. That is, the price of butter did not rise so high during the time of shortage, and did not fall so low in the time of abundance, in the second period as it did in the first. This points to some influence that must have been at work to diminish the range of fluctuations in the price of this commodity. In the case of eggs, the average price during the period of abundance was somewhat higher in the last decade, the figure being 17.8, as compared with 15.2 in the earlier decade. The average price for the period of shortage was also higher in the last decade, namely, 28.1, as against 25.03 in the earlier decade. This advance of price in the case of eggs for the period of short supply is explained by the conditions that have already been pointed out as accounting for the higher average of the price of eggs throughout the last decade.

The statistics of New York prices show a similar situation. The figures as presented before the United States Senate Committee on Manufactures by Mr. F. G. Urner are given in the following tables: —

Butter.

YEAR.	AVERAGE PRICE (CENTS).				
	1880-90.		1900-10.		
	June, July, August (Flush Production), Finest Creamery.	November, December, January (Short Production), Finest Creamery.	June, July, August (Flush Production), Finest Creamery.	NOVEMBER, DECEMBER, JANUARY (SHORT PRODUCTION). Finest Fresh Creamery.	NOVEMBER, DECEMBER, JANUARY (SHORT PRODUCTION). Cold-storage, Finest Creamery.
1880-81,	23¼	34	20	24¼	22
1881-82,	23	41	20	24¼	21¼
1882-83,	25¼	39¾	21	27½	25¼
1883-84,	22¼	38	20½	23½	21
1884-85,	20¾	31¼	18	27	24½
1885-86,	18¾	34½	20¾	25	22¼
1886-87,	18¾	30¾	20½	30	28¼
1887-88,	20¼	31¾	24½	29	27¼
1888-89,	19¼	33	23¼	31	28
1889-90,	17½	28½	26½	33¼	31¼
1890-91,	16¾	28	28½	29½	28¾
Average,	20½	33¾	22¼	27¾	25½

Eggs.

YEAR.	AVERAGE PRICE (CENTS).				
	1880-90.		1900-10.		
	April, May, June (Flush Production), Fresh Gathered.	November, December, January (Short Production), Fresh Gathered.	April, May, June (Flush Production), Fresh Gathered.	NOVEMBER, DECEMBER, JANUARY (SHORT PRODUCTION).	
				Fresh Gathered.	Cold-storage Eggs.
1880–81,	11¾	33	13	25	18½
1881–82,	16¼	27¼	13½	26½	19¼
1882–83,	19½	28¾	16¾	26	20¾
1883–84,	18¼	31	16	32½	24¾
1884–85,	16¼	27¾	17¾	28¼	20¾
1885–86,	14¼	24½	17¼	25¾	20½
1886–87,	12½	27¾	18	29¾	23
1887–88,	14¼	24¼	17¼	29½	18
1888–89,	16	22¼	17¼	32½	25½
1889–90,	13½	22½	21½	34	25
1890–91,	13¾	26½	21½	32½	23¾
Average,	15¼	26¾	17¼	29¼	21¾

These tables show that in the case of butter the price in the season of shortage was much lower during the period 1900–10 than during the earlier period 1880–90, the figures being 27¾ and 33¾, respectively. On the other hand, the price for the flush season was higher during the second period, 22¼, as against 20½ in the earlier period. The price of eggs for the season of short production was higher during the period 1900–10 than during the period 1880–90, the figures being 29¼ and 26¾, respectively; and the price of eggs for the season of flush production was also higher, in the second period standing at 17¼, as against 15¼ in the earlier period. Mr. Urner points out, however, that if the prices of cold-storage eggs were also taken into account the average price of eggs in the season of shortage would be actually lower in the second period than in the first. In this connection he offers the following suggestive comments on the egg supply and cold storage: —

> Again, the quality of the eggs quoted as fresh gathered during the season of the natural scarcity has been decidedly higher during the period from 1900–10 than it was during the period from 1880–90, before cold storage had become a factor of importance. The actual production of eggs during October, November and December is relatively very small. Before the days of general cold storage a larger quantity of late summer and early fall eggs was held back by the farmers, either in cellars or under other crude methods of preservation, and those were mixed in the shipments of the so-called "fresh-gathered" eggs during the later season of scarcity. This practice still exists to some extent, but far less than formerly, because of the availability of more perfect methods of preservation in cold storage; and the difference in quality of the fresh-gathered eggs, the average price of which is given as 29¼ cents during November, December and January in the period 1900–10, is more than sufficient to offset the higher level of quotations, as compared with the 26¾ cents average in the period 1880–90. And taking the average of the fresh-gathered and storage eggs together during the periods of shortage in the years 1900–10 it is seen that this average is lower than the average of the eggs available during that period in 1880–90.
>
> The above records of average prices disclose marked fluctuations from year to year, both during the season of greatest production and during the season of natural scarcity. These fluctuations are not and cannot be due to manipulation of the market by the use of cold storage, since they were as great during the period before cold storage was a factor of importance as they have been later. The fluctuations are due largely to variations in the relative distribution of egg production through different seasons of the year, which is very variable, to the influence of prices of other competing foods and to changes in general trade conditions affecting prices of all commodities.
>
> There is no question that in any given year the ability to carry eggs in cold storage up to and throughout the season of natural scarcity results in a higher price during the season of flush production than would prevail in that year if the right to so carry this

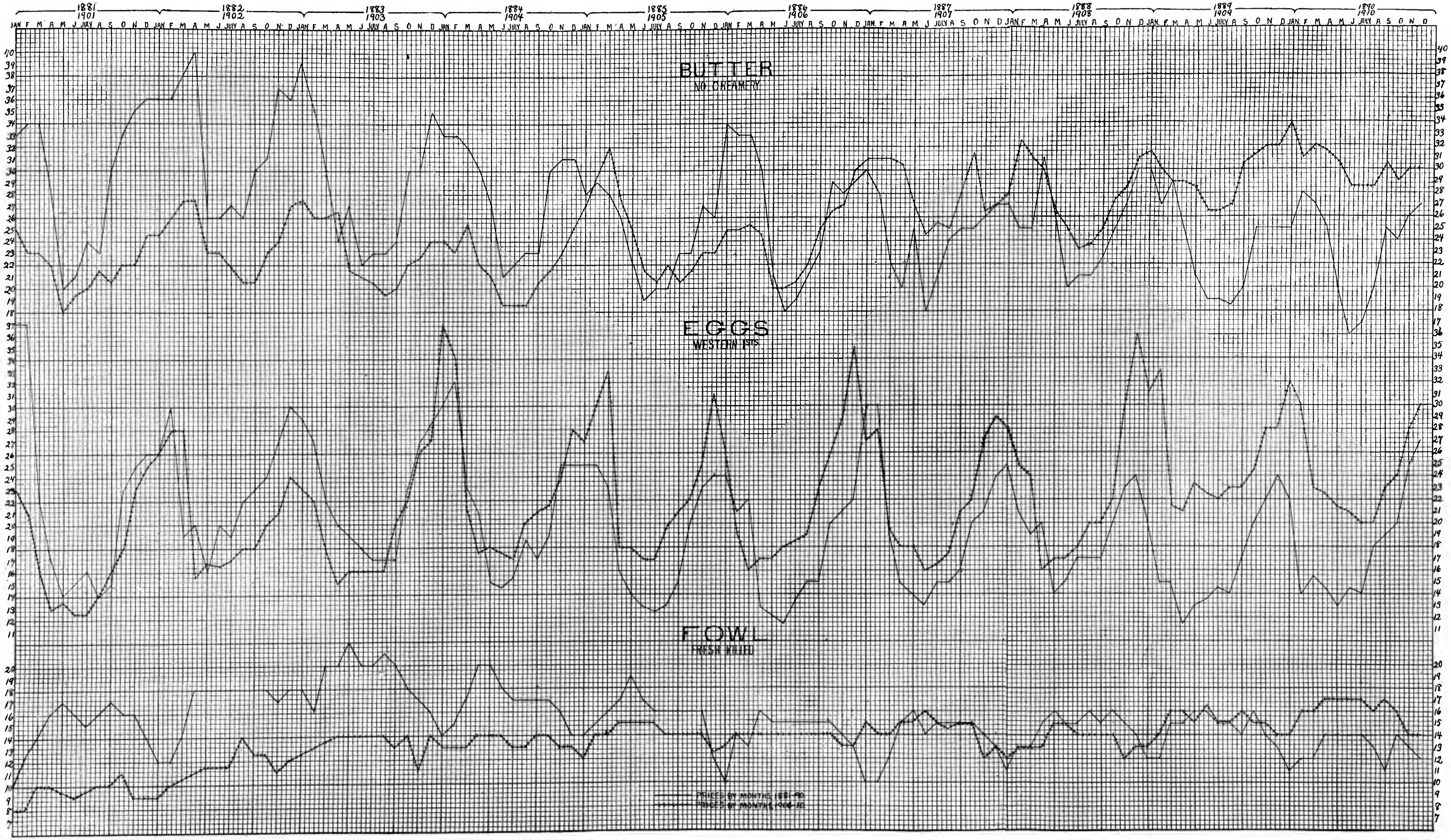
surplus were denied. But it is evident that the presence of the eggs so carried gives the people a larger quantity at lower average prices during the season of scarcity; and it is seriously to be doubted that in the long run — considering a term of years — the ability to store surplus enhances the price of eggs at any season, as compared with a term of years in which storage might be prevented or greatly restricted; because the tendency is to increase production to the maximum that can be sold at a profit to producers. The demand for eggs to store during the season of flush production is equivalent to just so much additional demand for consumption, and adds just so much to the opportunity for profitable production; whatever tendency it creates to enhance prices is met by the consequent incentive to produce more eggs, and normal price level is thus preserved, while the total of our egg supply is greatly increased.

The supposition that cold storage of eggs is used to elevate prices is utterly refuted by the statistics of prices given above, since it is shown that the cold-stored product is sold during the season of natural shortage in egg production at materially lower prices than are obtained during the season for the limited supply of "fresh-gathered" eggs, all of which at that season are put into prompt consumption upon arrival at distributing markets.

Comparative Fluctuations of Prices in Two Decades.

The comparative fluctuations of prices for the three commodities under consideration may be exhibited graphically by curves showing the monthly movement of prices during the two decades 1881–90 and 1901–10. For this purpose the monthly quotations of wholesale prices of the Boston market have been compiled from records of the Chamber of Commerce, and on the basis of these figures curves showing the monthly movement of the price of each commodity have been plotted. The price quotations are given in Appendix E, and the curves are shown on the chart opposite this page.

An examination of the chart discloses the fact that fluctuations of monthly prices were notably less for butter and poultry in the second decade under cold-storage handling than


1881 1901
1882 1902
1883 1903
1884 1904
1885 1905
1886 1906
1887 1907
1888 1908
1889 1909
1890 1910
JAN F M A M J JULY A S O N D
BUTTER
NO. CREAMERY
EGGS
WESTERN 1STS
FOWL
FRESH KILLED
PRICES BY MONTHS 1881-90
PRICES BY MONTHS 1901-10
40
39
38
37
36
35
34
33
32
31
30
29
28
27
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poultry in the second decade under cold-storage handling than in the first without cold-storage facilities. The fluctuations for eggs were slightly less in the second decade. The average of the extreme fluctuations measured from the highest point to the lowest point in each year was a little lower for the last decade than for the first. It should be observed here that one might expect a wide range of fluctuations in the case of eggs during the last decade, on account of the causes already mentioned as tending to bring about a higher range of prices for this commodity. The fact that the fluctuations were actually somewhat less in the second decade is thus rendered the more remarkable.

Secretary Wilson's Report on Prices.

The general conclusion that cold storage tends to make prices steadier throughout the year is confirmed by the results of studies made by the Bureau of Statistics of the United States Department of Agriculture, the results of which are presented in the last annual report of the Secretary of Agriculture, the Hon. James Wilson, in December, 1911. The report shows that under cold storage in recent years there has been an increasing tendency toward uniformity of prices in the case of butter, eggs, poultry and fresh mutton, but not in the case of fresh beef and fresh pork. The price quotations used in the investigation were collected by experts of the Bureau of Statistics from various sources in the libraries of Congress, the Department of Agriculture and other departments of the national government. The first quoted price of each month was taken from October, 1880, to October, 1911. Mr. George K. Holmes, the statistician of the Bureau who had charge of the investigation, states concerning the method of collecting price quotations: —

> During this period of thirty years grades have changed, and also the quoted grades. Error due to this fact was avoided by taking prices for grades that remained uniform from October to October

of the next year, since the series of 13 prices for each year, October to October, was to be converted into index numbers based on the mean monthly price for the year. The purpose of this compilation was to observe fluctuations, before cold storage existed or was of considerable account, and to compare with fluctuations in recent years, during which this business has grown to large proportions.

For this purpose three periods were taken: —

1. Period prior to cold storage, October, 1880, to October, 1893; about the latter year cold storage began to be used to such an extent as to exert perceptible influence on prices.
2. Early cold storage period.
3. Later cold storage period.

The cold-storage period was subdivided in order that the prices of the later years might be observed more closely. The early cold-storage period extends from October, 1893, to October, 1902, and the later cold-storage period from October, 1902, to October, 1911. The prices of each period were reduced to a mean for each month, as in the case of the first period. The next step in dealing with the figures was the conversion of the mean price of the first of each month for each group of years into a percentage of the mean for the year in each case. This gave index numbers which facilitated comparisons. The results of comparisons of the index numbers for the three periods designated are thus stated in the report: —

> It is evident, if the percentages, or index numbers, are 100 for all months, that there is a complete uniformity of prices throughout the year. Therefore a tendency toward uniformity of prices is a tendency toward 100, whether the index number is above or below 100.
>
> In comparing the first period with the last it appears that there was a tendency toward uniformity of prices in the case of butter in eleven out of the thirteen months, or much more than half; in the case of eggs and fresh mutton in nine months; poultry, eight

months. Less than half of the months exhibit this tendency in the cases of the other commodities, — five months for fresh pork and three months for beef.

If the second and third periods are compared, it appears that under the régime of cold storage there has been a tendency toward uniformity of prices for butter, eggs and fresh mutton; away from uniformity for fresh beef and fresh pork; and no change for poultry.

Another aspect of the matter may be had by noting the range of prices for the three periods.

For butter the difference between the highest and lowest index numbers is 43.3 for the first period, 29.4 for the second and 24.1 for the third. An approach toward uniformity is apparent, because the range between the highest and lowest prices diminishes.

In the case of eggs the range of prices increases from 72.3 for the first period to 74.6 for the second, but declines to 63.4 for the third.

An unbroken tendency toward uniformity appears in the case of poultry, since the range between highest and lowest prices diminishes from 28.9 for the first period to 23.5 for the second, and to 15.9 for the third.

Both fresh beef and fresh pork seem to have been subject to less uniformity of prices in the third period than in the first, as indicated by increasing range between highest and lowest. The range for beef rose from 8.2 in the first period to 9.4 in the second and to 14.3 in the third.

The range for pork fell from 14.4 in the first period to 14 in the second, but rose above the first to 16.7 in the third.

The foregoing examination of range of prices substantially indorses the other process in pronouncing in favor of a tendency toward uniformity of prices with regard to butter, eggs and poultry, and fresh mutton, and of a tendency away from uniformity with regard to fresh beef and fresh pork.[1]

While this report shows clearly that cold storage has tended to establish uniformity of prices in the case of the leading commodities handled by refrigeration methods, it purports to show, on the other hand, that cold storage has brought about a higher "annual price level" for butter and eggs. On the basis of this alleged effect of cold storage the sweeping assertion is made by Secretary Wilson that "cold storage has raised the cost of living." One might reasonably expect that a statement of such importance, to be circulated in a government report, would be supported by detailed presentation of the statistical data from which the conclusion was drawn. The statement is put forth, however, practically unsupported by statistical evidence. The figures on which the statement is based, and the methods of statistical tabulation and analysis to which the figures were subjected, are not stated in the report. In a paper read before the convention of the National Warehousemen's Association, in Chicago, in December, Mr. Holmes repeated the statement in question, but offered no more evidence or explanation in its support than did the Secretary of Agriculture in his report. The passage in the report relating to this matter reads as follows:—

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[1] Report, Secretary of Agriculture, 1911, pp. 30, 31.

> Before the advent of cold storage there was a relative monthly consumption of commodities, such as the foods now stored, throughout the year which was adapted to the current supply, and that supply was more or less closely related in time to the production.
>
> Cold storage has interposed to change considerably the relative monthly consumption and to make it more even throughout the year. To illustrate with a supposition: if 1 per cent. of the total amount of eggs consumed in a whole year were consumed in December before the day of cold storage, perhaps 3 per cent. is the figure for the present time.
>
> There has also been a change in relative monthly prices, due to cold storage. In the case of eggs the relative price has increased in the season of natural plenty and diminished in the period of natural scarcity.
>
> These two facts, the changes in the relative monthly consumption, and prices upon passing to the cold-storage period, have been arith-

metically related to each other for eggs and butter to discover the effect on the mean price for the year. It is not an undertaking that can be worked out with precision and can be only indicative.

The results are that in the cases of both butter and eggs the annual price level has been raised by cold storage, for a reason apart from the costs.

In two ways, then, cold storage has raised the cost of living.[1]

The conclusion that cold storage has brought about a higher annual price level would appear to have been reached by a method of combining index numbers of mean monthly prices and index numbers of average monthly consumption. The latter, it seems, were obtained by using returns made by warehousemen of the amount of goods received into cold storage and withdrawn in different months. In cases in which warehousemen made no returns on this subject, averages were used based upon the returns actually received. The secretary of this commission visited Washington for the purpose of obtaining further information concerning the methods employed in this statistical tabulation. Mr. Holmes was asked if he could place at the disposal of this commission the statistical tables on which the statement that cold storage has increased the cost of living is supposed to be based. He stated that the statistics had been compiled in some haste, as the Secretary of Agriculture desired to use the results of the investigation in his annual report. Mr. Holmes now wishes to revise the computations, and is not yet prepared to give out further information. He intimated that he was not at all sure about the method of estimating the monthly consumption, and wished to take this matter especially under careful consideration. It is his intention later to publish a bulletin giving the statistical tables in full. It is possible that the revision of the statistical work may lead to some change in the conclusions. As the situation stands, therefore, the statement that cold storage has raised the cost of living is practically without statistical foundation. The unpublished data on which it is supposed to rest are not accessible, and the methods by which they were analyzed and interpreted are not fully known. The figures were put through a patent process of statistical manipulation which cannot be examined until the bulletin of the Bureau of Statistics is published. Obviously, the validity of Secretary Wilson's statement depends upon the correctness of the methods by which the conclusion in question was reached. Until it is possible to examine figures and methods in detail there is no way of determining whether the statement is warranted or otherwise. Under the circumstances the statement must be regarded as in the highest degree inconclusive or tentative.

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[1] Report, Secretary of Agriculture, 1911, p. 29.

The fact of a change in monthly consumption through cold storage, which apparently plays the chief role in the methods of computation adopted by the government statisticians, is so obvious as to require no statistical demonstration. In consequence of cold storage, consumption is relatively greater in the months of scarcity at high prices, and relatively less in the months of abundance at low prices. It is conceivable that the average price per unit of output obtained by producers is consequently somewhat higher at the present time, as a result of cold storage. Before cold storage, roughly speaking, producers in the months of scarcity got very high prices for a very small quantity of goods, and in the months of plenty got very low prices for a comparatively large quantity. Now, under cold storage, in the months of scarcity producers get somewhat lower prices than formerly for a greatly increased quantity of goods, and in the months of plenty get somewhat higher prices than formerly for a smaller quantity sold to consumers. It may be that, if these changes could be statistically measured, they would show a higher annual price level for certain commodities. But this showing could not be described accurately as an increase of the cost of living. It would mean simply that more people are consuming perishable food products in the months of natural scarcity. In other words, cold storage has brought perishable food products within the reach of a larger body of consumers throughout the year, with the result that the per capita expenditure for such goods has increased. This phenomenon, however, is something very different from what is commonly understood as an increase of the cost of living. It would be more properly characterized as an expansion and equalization of the annual consumption of perishable food products.

Cold Storage and Speculation.

In connection with the general question of the influence of cold storage on prices, the subject of speculation in food products through this agency calls for special consideration. The opinion is undoubtedly widespread that cold-storage facilities have been used to carry on harmful speculation, to manipulate the market, to corner the supply and to advance the prices of food products. Consideration of this complaint against cold storage raises the question of the function of speculation in general. The business of dealing in food products through the medium of cold storage is essentially speculative, in the sense that it involves the purchase of commodities when prices are low, with a view to holding them and selling later, at a date when prices are high enough to afford profit on the transaction. All dealing in which the element of future delivery enters is speculative in principle. Speculation in general performs a useful function in the economy of production and distribution. It helps to relieve producers of the risk of undeserved losses through fluctuations of price. Before the development of modern speculation, as organized and conducted in the various exchanges, producers were obliged to bear a large amount of risk, on account of the liability of fluctuations of price during the interval between the beginning of the operations of production and the final sale of the products. This risk has been concentrated under speculation, and assumed by a specialized class of risk-takers. Speculation, if intelligently carried on, contributes to equalize supply and demand, thus diminishing price fluctuations. In the case of nonperishable commodities, such as cotton and wheat, the adjustment of supply to demand throughout the year is effected by the exchanges for dealing in such commodities. The institution of cold storage has made this equalizing process possible also in the case of perishable commodities, such as eggs and butter.

The function of speculation in effecting this equalization of supply and demand has been stated with admirable clearness by Prof. F. W. Taussig of Harvard University in his recently published "Principles of Economics:" —

> The fundamental effect of speculation is to promote the establishment of the equilibrium of supply and demand. It tends to make daily market prices conform to the seasonal market price, and to make the seasonal market price such that the whole seasonal supply is disposed of. Those who are skillful and painstaking in estimating the seasonal supply, and are shrewd and experienced in foreseeing the effect of a given supply on price, are the persons who are likely to make money in speculation. They buy when others offer at a price lower than the facts of the market warrant; they sell when others bid a price higher than the facts warrant. The more the dealings of the market are confined to buying and selling between such shrewd and experienced dealers, the more likely is it that the seasonal price will be quickly and smoothly reached, and the less will be the fluctuations in price. With the inevitable uncertainties as to the amounts of the forthcoming supplies and the conditions of consumption and demand, there will always be differences

of judgment between even the most expert dealers. There will be fluctuations in price, some ups and downs, some unexpected gains and losses, — "speculative" profits or losses. But the general effect of speculation is to lessen fluctuations, and promote the smooth course of exchange and consumption.[1]

In short, the influence of speculation is to lessen fluctuations in price and promote "the expedient rate of consumption." This is its tendency under the modern conditions of wide markets, full information, active competition. Cold storage has extended the field of speculation to include perishable food products. "The development of cold storage in recent times," declares Professor Taussig, "has led to precisely this sort of even distribution of supply under the influence of dealings that are essentially speculative. Fruit, meat, fish, eggs, no longer come on the market in spasmodic and irregular amounts. Supplies that are heavy at one time are bought by dealers, put in storage, and held for sale at a later period of scantier supply. Prices are more equable, and on the whole the profits of the dealers are probably less. There is less risk to them, and the community gets its supplies at a smaller charge for their services as middlemen."

But while speculation thus performs a useful function, it opens the way to abuses. In other words, there is legitimate and there is illegitimate speculation. The former consists in forecasting the market and operating to take advantage of the conditions thus anticipated. Legitimate speculation is beneficial to the industrial community, not merely profitable to the individual speculator. Illegitimate speculation, on the other hand, consists in attempting to manipulate the market and exploit the conditions artificially created by the speculator. When the speculator, instead of attempting to anticipate the natural movement of the market, goes further, and undertakes to influence the course of prices by cornering supplies, his operations become illegitimate. Such speculation may bring profit to the individual operator, but is causes disturbance and injury to the industrial community. Undoubtedly cold-storage facilities may be abused in this way to manipulate the market and to exploit the consumer. But, while such abuses are possible, a scrutiny of the facts of the situation shows that they are not frequent at the present time, and are not likely to become seriously troublesome in the future.

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[1] Taussig, "Principles of Economics," pp. 159, 160.

No Monopoly in Cold-storage Business.

One fact of significance in this connection not generally known is that cold-storage companies do not, as a rule, buy and sell on their own account. They merely store commodities for outside parties. There is a popular impression that the cold-storage business has assumed the nature of a trust or combination, which, through concerted action or agreement, determines the time when products shall be placed upon the market, the object being to control prices. While there may be exceptional instances among a few companies, the fact remains that a general understanding or agreement would be impossible, because the products held in cold storage are owned by thousands of independent firms, and are sold by them, and not by the cold-storage companies, to thousands of customers and distributing agencies and dealers, each of whom acts according to his individual judgment as to the proper time to sell and the prices to be charged. Practically none of the large public cold-storage warehouses have any pecuniary interest in the articles stored in them.[1] In this State several companies that do a public cold-storage warehouse business own part of the products which they handle, but these are fish-freezing establishments and small concerns which have erected refrigerating plants as subsidiary to a meat or provision business conducted by the owners. None of the large public cold-storage warehouse companies in this State own any of the products stored.

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[1] W. C. Jenkins, "The Truth about Cold Storage," National Magazine, August, 1911.

It may be remarked also at this point that there is no combination among the cold-storage companies in this State. The stocks of these companies are widely distributed among a large number of shareholders. The representation has been made to the commission that the business of operating cold-storage warehouses in Massachusetts has been highly consolidated and centralized. It has been asserted in this connection that one of the Boston cold-storage warehouse companies practically controls the others, and that this company in turn is controlled by New York capital, and operated in close connection with the cold-storage business in that city. In short, the contention is that a practical monopoly of the cold-storage business has been established. Investigation shows that this representation is unfounded. The financial control of the different Massachusetts companies is entirely distinct, and the ownership of the stock of these companies is widely distributed. The notion that New York capital controls the cold-storage business in this State is also mythical.

The records of the State Commissioner of Corporations show the number of stockholders of the leading cold-storage warehouse companies to be as follows: —

Boston Cold Storage and Terminal Company,	46
Boston Terminal Refrigerating Company,	28
Eastern Cold Storage Company,	163
Eastern States Refrigerating Company,	137
Gloucester Cold Storage and Warehouse Company,	34
New England Cold Storage and Warehouse Company,	3
Quincy Market Cold Storage and Refrigerating Company,	228
Worcester Cold Storage and Warehouse Company,	32

The only company in which the stock is not owned widely is the New England Cold Storage and Warehouse Company of Pittsfield, which has only 3 stockholders, but this company is a small one with a capital stock of only $5,000. Moreover, the products stored in the public cold-storage warehouses are owned by many persons and concerns. The number storing goods with the Quincy Market Cold Storage and Warehouse Company, the largest in existence, is over 3,000. Active competition prevails among the dealers who use the facilities offered by the cold-storage warehouses. Combination to control prices in this field would be difficult, if not impossible; the sources of supply of the food products handled in cold storage are too extensive. In his testimony before the United States Senate Committee on Manufactures, Mr. F. G. Urner spoke as follows of the competition among dealers and the practice with respect to storage: —

> In respect to the holding of many important food articles in storage — such as butter, cheese, eggs and poultry — there is a popular false impression that these articles are controlled by business combinations which, through unanimous agreement or direction of executive control, determine the times when the bulk of the products shall be marketed or withheld from sale, with the effect of controlling prices. The fact is that the articles above mentioned are manufactured or collected from producers by thousands of independent and unassociated persons or firms, sold by them to other thousands of independent distributing agencies, and by the latter to other thousands of smaller distributors and retailers, each of whom acts according to his individual judgment as to whether goods bought should be stored or placed in immediate consumption, and whether the goods already stored should be sold at once or carried for later markets. The basis of such action is purely the individual judgment of market conditions, present and prospective, and the effect upon market values is produced by the average policy of thousands of individual operators, buying and selling upon free and open markets.

It must be evident that, concerning perishable food products of seasonable production, or of greatly varying production from season to season, each year's product must, as a general rule, be consumed within the year, or before the recurrence of the next season of maximum production. Values are generally the lowest and qualities best in the season of greatest production; goods carried from one season of maximum production to the next must be sold in competition with fresh goods of the lowest natural value and of greater intrinsic worth because of their freshness. And the cost of carriage, under these circumstances, added to the impaired value of year-old goods, makes a certain loss on such as a general rule. Instances where goods are carried over from one season past the next season of flush production are rare and exceptional, although this course may sometimes be taken with comparatively small quantities in the hope that the next season of scarcity may lessen or obviate the loss.[1]

It has even been contended that there is less liability of market manipulation and food corners under the cold-storage régime than there was before the introduction of artificial refrigeration. The contention is that the increase in the volume of production that has been brought about by cold storage has made it more difficult for a speculator or group of speculators to get control of the supply. Prof. William T. Sedgwick of the Massachusetts Institute of Technology expressed such an opinion before this commission. He thought that it was easier for speculators to manipulate the market in the days before cold storage. "I think," he said, "that cold storage is a great safeguard, both to producer and consumer, and a very dangerous thing for manipulators. I should sum it all up in this way: it is a safeguard to the consumer and the producer, and a ticklish subject for the manipulator."

The opinion here expressed, with respect to the matter of combination or manipulation in the markets of perishable food products through the agency of cold storage, applies to the operations of the public warehouses. The latter, as has been stated, are not in the market themselves. The meat-packing establishments, however, operate their own cold-storage plants as a rule, and there is ground for believing that they have used these plants at times to speculate in eggs, butter and cheese, as well as in meat products. This commission has not investigated the meat-packing industry, as the subject was regarded as beyond the scope of its inquiry, and offers no conclusions with respect to speculation in this field. The commission finds that the public cold-storage warehouses in this State do not, except in rare cases, buy and store goods on their own account. If it were the practice of the warehouse companies to operate in the market, it might be advisable to prohibit such operations and restrict them to a purely warehouse business. The practice would be clearly objectionable from the point of view of the interests of both consumers and dealers. But as the warehouse companies do not engage in such operations to any appreciable extent, legislation would seem to be superfluous. Moreover, as the Commission on the Cost of Living of 1910 pointed out in discussing this subject, any statute limiting the operations of the cold-storage concerns to a purely warehouse business would be well-nigh impossible of enforcement, since it could be easily evaded by operating in the market through a subsidiary company. Under the circumstances, legislation in this matter would appear to be needless and useless.

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[1] Report, United States Senate Committee on Manufactures, 1910, pp. 211, 212.

Practice of Borrowing on Cold-storage Holdings.

One feature of the cold-storage business should be mentioned in this connection, which has some bearing on the question of speculation; that is, the practice of negotiating loans for customers on warehousemen's receipts. Most of the large public warehouse companies either lend money directly to their customers, or assist the latter in obtaining loans from banking institutions. The ability to borrow on goods in cold storage enables dealers to carry larger amounts of commodities than they would otherwise be able to hold, and to carry the goods for a longer time. The system of borrowing on warehousemen's receipts tends in this way to inflate the volume of speculative operations in foodstuffs. It thus creates a situation of financial insecurity. The calling of loans on warehousemen's receipts may at a time of overstorage and low prices cause a disturbance in the market. The collapse of the egg and butter markets in the spring of 1911 was due in part to this cause. To be sure, there were other causes for the collapse. The season of production had been unduly prolonged. Dealers had overestimated the demand of the market, and had put an excessive amount of butter and eggs in storage. A feature of the Payne-Aldrich tariff had also contributed to bring about overstorage of butter. Under that act butter and cheese are subject to higher rates of duty than cream; hence the creameries on the border bought cream on the Canadian side and made it into butter and cheese in this country. The fact that a large amount of goods was carried on borrowed capital was partly responsible, however, for the collapse. Unquestionably this practice brings about a financial situation that has in it possibilities of mischief.

Remedies for Abuses of Speculation.

The application of remedies for such abuses as have been indicated in connection with speculative operations in food products is extremely difficult. The legitimate and the illegitimate transactions in this field are indistinguishable in form. It is impossible to frame a law that will "hit the deer and miss the calf." In particular, it is evidently impossible to legislate against the practice of borrowing on warehousemen's receipts. The law cannot interfere with the merchant's right to borrow money on the security of his own property. In general, so far as the danger of market manipulation and food corners is concerned, there is already on the statute books a law which offers at least partial remedy for such abuses, in the form of a publicity cure. This is chapter 603 of the Acts of 1911, entitled "An Act to regulate the manufacture, production, transportation and sale of articles or commodities in common use." This act provides that upon complaint filed in the supreme judicial court or the superior court, alleging that any party has entered into an agreement to monopolize an article of common use or to restrain competition in any such article, or to enhance its price unduly, the court shall hear the complainant and witnesses, and, if it appears that such arrangement actually exists, the court, after a hearing of the parties concerned, shall appoint a master to take evidence upon the complaint. The latter shall hold a hearing and file his report within thirty days after it is closed. The report, if affirmed by the court, shall then be transmitted to the Attorney-General, who shall forthwith cause such further proceedings, either civil or criminal, to be instituted as the report may warrant. This act furnishes for persons who may have cognizance of speculative manipulation of the prices of food products a method of procedure by which the facts may be judicially determined, and prosecution may be instituted by the law department of the Commonwealth.

Conclusions with Respect to Prices and Speculation.

The foregoing discussion of the influence of cold storage on prices, and of speculation through this agency, may be summarized briefly as follows: —

1. The per capita receipts of the chief food products subject to cold-storage handling, namely, — eggs, butter and poultry, — increased greatly in the Boston and New York markets during the decade 1901–10, as compared with the decade 1881–90, prior to the general adoption of cold-storage methods. This fact appears to indicate that cold storage has contributed to increase the volume of production.

2. The average prices of butter and poultry were lower in the second decade than in the first; the average price of eggs was slightly higher, but this fact is explained by peculiar conditions affecting the egg market. The lower average of prices in the case of butter and poultry would seem to be a result of the increased volume of production, attributable in part to the influence of cold storage.

3. The average price of butter for the season of scarcity was considerably lower in the second decade than in the first; the average price of eggs for the same season was somewhat higher in the second decade, in consequence of the conditions already mentioned as affecting the price of eggs. The average prices of both commodities for the seasons of abundant production were somewhat higher in the second decade. These facts point to an influence of cold storage in the direction of lowering prices during the season of scarcity by increasing the supply offered for sale, and raising prices in the season of plenty by taking goods off the market.

4. The extent of price fluctuations of the three commodities was less in the second decade than in the first. The lessened fluctuations of price would seem to be a result of the more even distribution of the supply of perishable food products over the market year, facilitated by cold storage.

5. The business of dealing in perishable food products through the medium of cold storage is essentially speculative,

but this is a form of speculation which, when properly carried on, performs a legitimate function, — that of adjusting the supply of such products to the demand, thus helping to bring about a lower and steadier range of prices.

6. The facilities offered by cold storage may be abused to manipulate prices, as may the machinery of speculation in general, but liability of serious injury to the consuming public through such action is not great, because of the enormous practical difficulties in the way of artificially controlling the supply of food.

7. The practice on the part of cold-storage companies of negotiating loans for customers on warehousemen's receipts, although legitimate in itself, increases the danger of harmful speculation and market disturbances, but effective control of abuses of this practice seems impossible.

8. The law already provides machinery by which alleged abuses in the way of manipulation of food prices may be investigated and prosecution instituted, through the provisions of chapter 503 of the Acts of the year 1911.

III.

1. EXISTING LEGISLATION RELATING TO COLD STORAGE.

One of the first tasks of the commission was to secure definite information concerning the laws for the regulation of cold storage thus far enacted in other States. For this purpose an inquiry was addressed to the Secretaries of State in all the States and the District of Columbia, asking for information with regard to legislative action on the subject of cold storage. The questions asked were these: First, has any law with reference to the subject of cold storage of food or food products been enacted in your State? Second, has any bill relating to this subject been introduced in the State Legislature? Third, has any investigation of this subject been ordered by legislative authority?

Forty-four replies were received. The only States from which no reply could be obtained, upon repeated request, were Georgia, Kentucky and Mississippi. It appears from the replies that only 6 States have enacted laws on the subject of cold storage, namely, California, Delaware, Indiana, Kansas, New Jersey and New York. In 30 of the 38 States not having any laws for the regulation of cold storage no bill relating to this subject has been introduced in the State Legislature. The 8 States in which bills have been introduced, but not enacted, are Colorado, Illinois, Michigan, Missouri, New Hampshire, Pennsylvania, Virginia and the District of Columbia. In none of the 44 States from which replies were received has any investigation of this subject been ordered by legislative authority.

It appears that 5 of the 6 States having cold-storage legislation passed these laws in 1911. The Kansas law alone dates from an earlier year — 1907. This law, however, relates only indirectly to cold storage; it merely prohibits the sale of undrawn refrigerated poultry. Cold-storage legislation proper had its beginninng in 1911. It is accurate to term this legislation a result of the agitation concerning the high cost of living which culminated in 1910. In casting about for explanations of the increase of the cost of living, the public hit upon cold storage as one of the causes. The resulting criticism of cold storage furnished occasion for the proposal of bills in various State Legislatures for its regulation, especially through the limitation of the period for which goods might be held in refrigeration. None of the bills introduced in 1910 became a law; but in 1911 5 States placed cold-storage enactments on their statute books.

Of the acts passed in 1911, the two California laws are special statutes, limited in scope. They merely prohibit the representation of cold-storage products as fresh goods, and require that butter and eggs stored for more than three months shall be marked to show the time of storage, and that a sign, "Cold-storage eggs or butter sold here," shall be displayed where such goods are sold. The laws of the other 4 States, Delaware, Indiana, New Jersey and New York, are broad in scope, and lay down certain regulations with respect to the cold-storage business. There is a general similarity in their provisions. The leading features which they have in common are these: —

1. Cold-storage plants are placed under the inspection of the State Board of Health, which is given specific duties and powers with respect to such inspection.

2. Cold-storage products must be marked or tagged with the date of entry into storage, and in Indiana and New York with the date of withdrawal from storage also.

3. A time limit is fixed for the permissible retention of

goods in cold storage, namely, six months in Delaware, nine months in Indiana, and ten months in New Jersey and New York.

4. Certain restrictions are imposed upon retailers to protect consumers against deception in the sale of cold-storage goods, — except in New Jersey, which has no such provision in the law.

The provisions of these statutes can be presented most clearly in tabular form, as follows:[1] —

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[1] The text of the laws is printed in Appendix B, and the regulations laid down by State Boards of Health for their enforcement will be found in Appendix C.

Laws relating to Cold Storage.

State.	Date and Scope of Act.	Time Limit.	Marking.	Inspection.	Duties and Powers of State Board of Health.	Reports.	Methods of Enforcement.	Regulation of Dealers.	Miscellaneous.	Penalties.
California,	March 6, 1911, and March 14, 1911. Eggs and butter.	-	-	-	-	-	-	Representation of cold-storage products as fresh prohibited, Act of March 6. Butter and eggs stored for more than three months must be marked on containers with time of storage. Sign "Cold-storage Eggs or Butter sold here" must be displayed, Act of March 14.	-	Violation a misdemeanor. Acts of March 6 and March 14. Fine, $250, imprisonment not exceeding six months, or both. Act of March 14.
Delaware,	April 19, 1911. Fruits and fish excepted.	Six months; may be extended to eight months by State or local board of health.	Food or package containing it to be marked with day, month or year of receipt.	By State Board of Health, or local board of health having jurisdiction.	To enter and inspect plants; to make reasonable rules and regulations; to extend time of storage, but not to	Quarterly, to State Board of Health.	Board of health having jurisdiction to be notified in case of goods kept beyond limit, and Board's certificate required for	Sale of undrawn cold-storage poultry prohibited; sale of cold-storage eggs from original container required.	-	Violation a misdemeanor. Fine of $100 to $1,000, or imprisonment for sixty days to one year, or both.

					exceed eight months.		removal of goods. Certified goods not removed within sixty days sold at auction.			
Indiana,	March 2, 1911. All food products. Warehouse defined as "one employing refrigerating or ice machinery for the purpose of refrigeration, whether for public or private use."	Nine months; also, all food products now in cold storage to be removed and placed on market within nine months from passage of act.	Product itself or original package to be marked with date when placed in storage and date when removed from storage; sale of products coming from outside the State prohibited, unless previously marked as provided in act.	By State Board of Health.	To enter and inspect plants; to enforce act; and to adopt such rules as may be necessary for the latter purpose.	Records of receipts and withdrawals to be kept, but reports not required.	State Board of Health to be notified in case of goods kept beyond limit; any such food product to be inspected by Board, and if found to be unfit for human food, delivered to the nearest circuit or city judge, who shall order it to be drenched with kerosene oil, or to be rendered into grease or tankage, or otherwise made unfit for human food.	Date marks on containers not to be removed. Sale of storage eggs as fresh prohibited. Card bearing words "Cold Storage" to be placed on every receptacle containing eggs stored thirty days; bag in which such eggs are delivered to purchaser to be marked "Cold Storage."	Warehousemen required to take out license from State Board of Health; fee, $10. License to be revoked if unsanitary conditions are discovered.	First offense, fine, $25 to $50; second offense, fine, $50 to $100; third and subsequent offenses, fine, $200 and imprisonment thirty to ninety days.
Kansas,	Feb. 7, 1907. Poultry, game and fish.	-	-	-	-	-	-	Sale of undrawn refrigerated poultry, game and fish prohibited.	-	Violation a misdemeanor. Fine, $50 to $100.

Laws relating to Cold Storage — Concluded.

STATE.	Date and Scope of Act.	Time Limit.	Marking.	Inspection.	Duties and Powers of State Board of Health.	Reports.	Methods of Enforcement.	Regulation of Dealers.	Miscellaneous.	Penalties.
New Jersey,	April 21, 1911. All articles used for food, except liquid food.	Ten months; may be extended by State Board of Health.	Food or package containing it to be marked with day, month and year of receipt. Receipt of goods kept in cold storage outside the State prohibited unless previously marked as provided in act, except with consent of State Board of Health.	By State Board of Health.	To enter and inspect plants; to make reasonable rules and regulations; to extend time of storage.	Quarterly, to State Board of Health.	State Board of Health to be notified in case of goods kept beyond limit, and certificate required for removal of goods. Certified goods not removed within twenty days to be sold at auction.	-	Transfer of goods from one warehouse to another for purpose of evading act prohibited; return of food to storage after release prohibited.	First offense, fine not exceeding $500; second and subsequent offenses, a misdemeanor.
New York,	June 15, 1911. Nuts, fruits, cheese and vegetables excepted.	Ten months; twelve months for butter.	Food or package containing it to be marked with day, month and year of receipt and also of withdrawal.	By State Board of Health.	To enter and inspect plants; to make reasonable rules and regulations, but not to extend time of storage.	Three reports annually to State Board of Health.	-	Cold-storage products must be represented as such when sold.	Transfer of goods from one warehouse to another for purpose of evading act prohibited; return of food to storage after release prohibited.	Violation of act a misdemeanor. No penalties prescribed.

Enforcement of New York and New Jersey Acts.

The legislation of New York and New Jersey has naturally attracted the most attention in this Commonwealth. The laws of these two States, while broadly similar in their general provisions, differ in certain important details. The differences may be summed up thus: —

1. The New Jersey act applies to all foods except liquid food; the New York act excepts from the restrictions nuts, fruits, cheese and vegetables.

2. The New Jersey act fixes a ten months' limit for all foods; the New York act allows butter to be stored for twelve months.

3. The New Jersey act requires quarterly reports by warehousemen to the State Board of Health; the New York act requires only three reports annually.

4. The New Jersey act requires marking only with the date of receipt into storage; the New York act requires marking with the dates of both receipt and withdrawal.

5. The New Jersey act grants power to the State Board of Health to extend the time of storage; the New York act contains no similar provision.

6. The New York act requires that cold-storage products shall be so represented when sold; the New Jersey act contains no similar provision.

7. The New Jersey act provides for notification to the State Board of Health of the expiration of the time limit and inspection by the Board of goods held beyond the limit; the New York act does not require this.

8. The New Jersey act provides for the disposal by auction sale of goods held beyond the time limit and not called for by the owners; the New York act contains no provision with reference to the disposal of such goods.

Members of this commission visited New York and New

Jersey, and made inquiries with regard to the working of the cold-storage laws in those States. The New York Department of Health has an appropriation of $40,000 for the enforcement of the cold-storage act. The department has appointed seven inspectors of cold-storage plants, and eventually will employ a force of ten or twelve inspectors. The department has proceeded vigorously in the enforcement of the law. Mr. Thomas A. Brennan, author of the act, was engaged as special counsel of the department, to assist in prosecutions for violations of the statute. At this writing, December 20, 20 prosecutions have been brought and 8 convictions secured, all for violation of the marking provision. The constitutionality of this provision was contested by the cold-storage warehousemen, against whom prosecutions were brought, but the law was sustained in this particular by the New York Court of Special Sessions, and other lower courts in the State.

In an official statement given out in August, the New York Department of Health declared that the results of the first inspections made under the law demonstrated "the great need for this legislation, especially from a public health standpoint." The department stated that although in modern plants the conditions were fairly satisfactory, in others, as many as in 4 of the first 12 inspected, conditions were far from satisfactory. The reports of inspectors showed that in these places the floors were not in good condition and rooms in which meats were stored were filled with dirty barrels and rubbish. The department declared further that some of the establishments were conducted with little regard to scientific principles, the temperature in some cases being much higher than that acknowledged by experts to be necessary for the proper preservation of the food. It was predicted by the department that the results of this legislation "will be of great benefit to the public and will ensure that cold-storage plants are kept in proper sanitary condition, and that the foods are marketed after a reasonable period and sold for what they are."

In a report submitted to the Governor December 22, the New York Commissioner of Health, Dr. Eugene H. Porter, gives further information regarding the enforcement of the cold-storage act. He reports that, out of about 150 plants in the State, about 70 are engaged in storing food products that come within the provisions of the statutes; the other plants store only fruits and other articles not included under the regulations of the law. The commissioner states that the first reports filed with the department by the cold-storage plants under the law show that there were in storage on September 1 in these plants the following quantities of goods: 790,712 cases of eggs, of 30 dozen to the case, or a total of 284,856,320 eggs; 10,884,425 pounds of butter; 4,492,784 pounds of poultry; 2,500,000 pounds of fresh meat, and over 2,000,000 pounds of salted meats. The commissioner adds this comment: "It is apparent, therefore, that not only is the proper enforcement of this law important as regards the effect upon the consumer of the storage of food products, but also in the attempt to regulate a business of such magnitude by the State without unnecessary injury to a legitimate business. It should be stated that the majority of the cold-storage plants are being conducted in compliance with the law and without attempt at evasion, and that willful violation of the statute will meet with prompt prosecution when sufficient evidence is obtained to proceed against them." The secretary of the New York Department of Health informs this commission that the law is working satisfactorily, and that the department does not contemplate the proposal of any amendments of the act.

The New Jersey Board of Health has made less stir in the enforcement of the cold-storage regulations than has the New York health department. This Board has only a small appropriation at its disposal — $3,500. The chief of the Bureau of Food and Drugs, Dr. R. B. Fitz-Randolph, who has charge of the enforcement, informed this commission in September that one inspector had already been appointed to enforce the act, and that another inspector would later be employed. He stated that no prosecutions had yet been instituted under the law. Preliminary inspection of the warehouses had shown conditions to be generally satisfactory and sanitary. Dr. Fitz-Randolph is of the opinion that the law should require cold-storage goods to be marked with the date of withdrawal from storage as well as the date of entry into storage, and intends to ask the Legislature to amend the law in this respect.

Indiana and Delaware Legislation.

The State food and drug commissioner of Indiana, Dr. H. E. Barnard, informs this commission that the cold-storage act in that State is working well. In a communication dated Oct. 10, 1911, he writes: —

> It may be interesting for you to know that while the cold-storage operators fought the bill as first proposed, they supported and assisted in passing the final draft. At the present time they advise me that they are quite satisfied with its provisions, and that they believe the law is constructive legislation which will improve the conditions surrounding the storage of food without in any way restricting or hampering the proper development of the cold-storage business. . . .
>
> For your further information I may add that we have up to this time licensed forty-four cold-storage warehouses in this State. Some of them are large houses, while others are small houses devoted chiefly to the holding of eggs, fruits and meat pending the collection of carload lots for shipment east.

The secretary of the Delaware Board of Health, Dr. A. E. Frantz, in reply to an inquiry with respect to the working of the cold-storage act in that State, informed this commission that as yet there had been no prosecutions under the law, but gave no further information on the subject.

2. BILLS INTRODUCED IN MASSACHUSETTS LEGISLATURE.

The first bill relating to cold-storage introduced in the General Court of this Commonwealth was House, No. 1244, of the year 1910. This bill provided for the marking of cold-storage products with the dates of receipt and withdrawal, and limited the time of storage to three months. In the session of 1911 four bills for the regulation of cold storage were introduced, namely, House No. 261, House No. 262, House No. 1129 and House No. 1328. The essential provisions of these bills may be summed up as follows: —

House No. 261. — No article of food shall be held in cold storage for more than ninety days. The date of receipt shall be marked on the package or receptacle of each article of food placed in cold storage, and a corresponding entry made in the books of the warehouse. Cold-storage plants shall be open at all times to the inspection of the State Board of Health and the local board of health.

House No. 262. — A tag bearing the dates of receipt and withdrawal shall be affixed to any meat, fowl, fish, fruit or perishable product intended for use as human food which may be deposited in cold storage. Such tag shall be displayed by the retailer to prospective purchasers. No person shall alter, deface or destroy any such tag or separate it from the food prior to sale by the retailer. The State Board of Health is entrusted with the enforcement of the act and empowered to make needed rules and regulations.

House No. 1129. — No person, firm or corporation engaged in the business of keeping a public warehouse, or in the business of cold storage shall permit any fowl, eggs, raw beef or fish to remain in cold storage longer than six months. Further, no person, firm or corporation having possession or title of any fowl, eggs, raw beef or fish shall permit same to remain in their possession or in the possession of a public warehouse or cold-storage plant longer than six months. Notice of the deposit of fowl, eggs, raw beef or fish in cold storage shall be sent to the local board of health, with a description of the goods; and when such products are disposed of by sale or otherwise while in storage, notice shall be filed with the board giving the name of the person to whom such products have been sold. Any fowl, eggs, raw beef or fish remaining in storage longer than six months shall be condemned and destroyed by the local board of health.

House No. 1328. — Articles kept in cold storage shall be marked on the package or receptacle with the dates of receipt and withdrawal; when cold-storage products are offered for sale at wholesale or retail, there shall be displayed on or near the goods a statement that they were taken from cold storage, and such statements shall show also the length of time during which they were kept in cold storage.

IV.

CRITICAL CONSIDERATION OF PROPOSALS OF LEGISLATION.

The measures for the regulation of cold storage thus far proposed or adopted may be classified, for the purpose of discussing the expediency and desirability of legislation, as follows: —

1. Inspection of cold-storage warehouses.
2. Marking or tagging of cold-storage products.
3. Limitation of the time of cold storage.
4. Regulation of the sale of cold-storage goods.
5. Miscellaneous subjects of legislation, including prohibition of restorage and requirement that cold-storage products shall be sold only in a frozen condition.

1. INSPECTION OF COLD-STORAGE WAREHOUSES.

The desirability of inspection of food products consigned to cold storage is generally conceded by scientific experts who have investigated this question, by dealers in food products and by cold-storage warehousemen. Resolutions strongly expressing approval of a system of inspection have been adopted by the National Warehousemen's Association, the National Poultry, Butter and Egg Association, and other organizations representing the business interests related to cold storage. The resolution on this subject adopted by the National Warehousemen's Association at its last annual meeting in Chicago, Dec. 6 to 8, 1911, reads: —

> *Resolved,* That we reaffirm the position taken one year ago by this association in favor of the principles of supervisory inspection of foods entering cold storage, and giving information to the consumer

> concerning the history of cold-storage food products offered for sale, provided that it could be accomplished practically and with uniformity.

The resolution of the National Poultry, Butter and Egg Association, adopted at its annual convention in Chicago, Oct. 23 and 24, 1911, reads: —

> *Resolved,* That this association expresses its approval of . . . supervisory inspection of foods before entering into cold storage, and, if desired, during the storage period.

The proposal of inspection was approved by representatives of the Boston Fruit and Produce Exchange, who appeared at the hearings before this commission. The need of inspection is conceded even by those who oppose other proposals for the regulation of cold storage. The only objection to the principle of inspection which has come to the attention of this commission is one that was urged by Mr. Charles E. Littlefield, representing a committee of the cold-storage warehousemen, manufacturers of refrigerating machinery, refrigerating engineers, and the poultry, egg, butter and salt-water fish industries, before the United States Senate Committee on Manufactures. Mr. Littlefield contended that the effect of inspection would be to promote consolidation or concentration of the business interests affected, to the injury of independent dealers. He stated: —

> Before referring in detail to the provisions of the bill there is a suggestion that should be made with reference to the question of inspection. While the primal importance of an inspection of food products, so as to insure their good condition when they enter cold storage, is obvious, there is a vital economic fact that must not be lost sight of when legislation providing for inspection is being enacted, or when the authority for making rules and regulations is being conferred, and that is that the inevitable tendency of legislation

or regulation on a comprehensive scale requiring such inspection, especially if it is drastic in its character, is to consolidate the handling of such products in the hands of a few great corporations, and eliminate the existing independent producer and handler. It is, we understand, generally conceded that the operation of the inspection laws now in existence with reference to meats has been to consolidate or concentrate the business of handling meat in the hands of a few, and to destroy in a large degree effective competition. Our clients are independent producers and handlers of food products. They most earnestly and vigorously protest against any legislation or regulation requiring such a drastic inspection as will result in the placing of a club in the hands of great aggregations of capital, which will aid such aggregations in driving them out of business, and thus throttling the independent competition that now exists.[1]

This commission does not recognize it to be a fact generally conceded that the operation of the national meat inspection laws has tended "to consolidate and concentrate the business of handling meat in the hands of a few, and to destroy in a large degree effective competition." The organization of the meat-packing industries had already reached a high degree of concentration before the establishment of the system of national inspection of meat products. The latter, in fact, was consequent upon the former — not its cause. The objection under consideration carries little weight.

Both National and State Inspection needed.

The only essential difference of opinion among those who favor inspection relates to the question whether such inspection should be established by national or by State legislation. Some who favor inspection believe that only national inspection is necessary, and that only national inspection alone is adequate to solve the problem of cold-storage regulation. Others hold that State inspection also is needed. This commission is of the opinion that it is desirable to establish a system of national inspection of cold-storage warehouses, similar to the system of supervising meat-packing establishments now in operation. It is further of the opinion that State action on this subject is also advisable. There is no assurance that national legislation for the supervision of cold-storage plants will be enacted in the near future. In the absence of national inspection it seems desirable for the Commonwealth to establish a system of inspection by the State Board of Health. Moreover, a national cold-storage act would apply only to interstate and foreign commerce. It could not reach commodities produced, stored and sold within the boundaries of a single State; nor could it control cold-storage products that have been shipped into the territory of a State and have become a part of the internal commerce of that State. On the other hand, State inspection alone is insufficient here, as the greater part of the cold-storage business is of an interstate character, and can be controlled thoroughly and uniformly only through national legislation. In fact, both national and State inspection are needed in this field; the two systems supplement each other.

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[1] Hearings, United States Senate Committee on Manufactures, 1911, p. 434.

Inspection of Goods on Entry into Storage.

The establishment of a system of inspection that will effectively supervise the handling of food products during cold storage involves various difficulties. Physical examination of each article, or even of each package, that goes into cold storage appears to be impracticable. The Quincy Market Cold Storage and Warehouse Company has twenty-one warehouses. The daily receipts of poultry in these warehouses amount sometimes to more than 9,000 packages; the receipts of eggs occasionally exceed 9,000 cases of 30 dozen each; the receipts of butter at times exceed 8,500 tubs, and the receipts of fish, 230,000 pounds. To inspect each package, case or article would call for an army of inspectors, and would cause serious inconvenience and delay in the handling of the goods.

The suggestion has been made that inspection might well be confined to the examination of goods upon withdrawal from storage. This proposal has been submitted to the commission by Mr. Charles H. Utley, as follows: —

> It is, of course, true that if goods are bad when they enter cold storage they are bad when delivered. It is also a fact that some goods which were good when put in cold storage may be bad when taken out. Such goods would be, for the most part, goods stored at high temperatures, and it would be fully as effective to have them inspected at the time of delivery. This would require less inspectors and much less expense. Any method that is adopted will necessarily be to a considerable extent experimental, and quite likely to have to be changed to suit conditions as they develop.
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> It must be kept in mind in connection with the feature of inspection, as a means to protect the public health, that the nearer to the consumer the inspection is made the greater the protection. The nearest point to the consumer where inspection can be made is the place where he buys his goods. Much could occur between the time when goods leave the warehouse and the time when they are delivered to the consumer.

This suggestion is open to obvious criticism. It is easy to understand why the cold-storage warehousemen should prefer to have inspection confined to the withdrawal of goods from storage, as this would give them an opportunity to take all goods that might be offered and hold them for the full time that might be permitted by law without the annoyance of submitting them to inspection. The argument in support of this plan is, however, fallacious. It is generally recognized to be desirable to bring inspection as near the source of production as possible, rather than close to the consumer. It is clearly desirable to stop the distribution of unwholesome food products at the earliest possible stage in the process of passage from the original producer to the ultimate consumer. This principle is applied in the case of meat inspection, milk inspection and other branches of food inspection. If the principle of bringing the inspection as near as possible to the consumer were adopted, this would involve the complete exemption of cold-storage warehouses from any inspection; the inspection would be deferred until the goods passed into the hands of the retailers. Manifestly, however, it is much more feasible and economical to apply inspection while the goods are concentrated in the large cold-storage warehouses. The proper time to inspect goods here is the time of entry into storage. The main object of inspection is to ensure the proper selection and preparation of goods that go into cold storage. Inspection at the time of receipt would be much more effective in its influence upon dealers, — in increasing their carefulness in the selection and preparation of goods for storage, — than would inspection at the time of withdrawal. The logical method is unquestionably inspection upon receipt. The goods would, of course, then remain under the surveillance of the inspection authorities during the period of storage.

If inspection upon entering storage be adopted, then the further question arises whether inspection should be required also upon withdrawal from storage. In case a time limit for the retention of goods in storage be fixed, it would seem to be unnecessary to require inspection of goods taken from storage within such limit. The time limit would presumably guarantee the proper quality of goods inspected upon entry and withdrawn from storage before the expiration of the legal period.

Provisions for Inspection in State Laws.

There is some difference of opinion as to whether inspection should be conducted by the State or by the local health authorities. In 1910 an act was passed, on recommendation of the Commission on the Cost of Living, providing for compulsory inspection of cold-storage warehouses by local boards of health. This act provides: —

> Boards of health of cities or towns, by themselves, their officers or agents, shall make frequent inspection of all cold storage or refrigerating warehouses used for the storage of food products and for this purpose shall have all the powers of entry now conferred by law for purposes of such inspection.

Inquiries instituted by this commission show that this law has been of little practical benefit outside of the city of Boston. Some local boards of health, in whose territory cold-storage warehouses are situated, made their first inspections of these establishments after their attention had been directed to the law through a circular of inquiry sent out by this commission. It is the opinion of this commission that a system of inspection by the State Board of Health of food products upon entry into cold storage should be established in this Commonwealth.

The State Board of Health already has the power under existing laws to enter and inspect cold-storage warehouses. The section of the law defining the duties and powers of the Board provides that it "shall make sanitary investigations and inquiries relative to the causes of disease . . . and relative to the sale of drugs and food and the adulterations thereof; and shall gather such information relative thereto as it considers proper for diffusion among the people."[1] Further, in the performance of its duties relative to the sale of drugs and food the Board may "appoint inspectors, analysts and chemists, and may remove them." Such inspectors are given the same power and authority relative to drugs and food as is conferred by law on the milk inspectors. This means that they may enter all places in which drugs and food are stored or kept for sale, and all carriages used for their conveyance, and may take samples for analysis. Inspectors shall cause such samples to be analyzed or otherwise satisfactorily tested, and shall record and preserve as evidence the results of such examination. They shall, furthermore, if they have reasonable cause to believe that the provisions of law with respect to adulteration have been violated, and on the information of any person who lays before them satisfactory evidence by which to sustain complaints of such violation, institute complaints against the parties involved.[1] Another section of the law provides: —

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[1] Revised Laws, chapter 75, section 4.

> Whoever knowingly sells, offers or exposes for sale or has in his possession with intent to sell for food any diseased animal or any product thereof, or any tainted, diseased, corrupted, decayed or unwholesome carcass, meat, fish, vegetables, produce, fruit or provisions of any kind shall be punished by a fine of not more than one hundred dollars or by imprisonment for not more than sixty days, or by both such fine and imprisonment; and whoever knowingly sells any kind of diseased, corrupted or unwholesome provisions, whether for meat or drink, without making their condition fully known to the buyer shall be punished by a fine of not more than two hundred dollars or by imprisonment for not more than six months.[2]

These provisions of law confer certain powers of inspection upon the State Board of Health with respect to food products stored in cold-storage warehouses, but prescribe no specific duties in this connection. At the present time the Board has four food and drug inspectors. One of these inspectors has been detailed to make examination of foods in cold storage. The work in this field has consisted chiefly in the inspection of cold-storage broken eggs, so called, — that is, eggs broken into cans and frozen hard, which are used largely by bakers.

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[1] Revised Laws, chapter 75, section 5; chapter 56, sections 42 and 52.

[2] Revised Laws, chapter 56, section 73.

Recommendation on Subject of Inspection.

The scope of the inspection of cold-storage warehouses conducted by the State Board of Health should be extended. The Board should be given specific duties as well as general powers relative to such inspection. The provisions of law defining the duties and powers of the State Board of Health with respect to the inspection of cold-storage plants should cover these essentials; first, that all goods deposited in cold storage shall be in proper condition for preservation by this method; second, that it shall be the duty of the State Board of Health to inspect such goods upon entry into storage by methods that will secure proper enforcement of this provision, and for this purpose that the Board shall have all necessary powers of entry and examination; third, that the Board shall have authority to prescribe rules and regulations, to appoint inspectors, and to work out the details of a system of inspection adequate to secure proper compliance with all provisions of law applying to cold-storage warehouses. These principles are embodied in the draft of a bill submitted by this commission in the following form: —

SECTION 3. No article of food intended for human consumption shall be placed in cold storage if deemed by the state board of health to be diseased, tainted or otherwise unwholesome, or if not slaughtered, handled and prepared for cold storage in accordance with such rules and regulations as may be prescribed by the state board of health for the sanitary preparation of articles of food for cold storage, under the authority hereinafter conferred.

It shall be the duty of the state board of health to inspect and supervise all cold storage or refrigerating warehouses in this commonwealth, and to make such inspection of the entry of articles of food therein as the board may deem necessary to secure proper enforcement of this act. The members of the board, or its duly authorized agents, inspectors or employees, shall be permitted access to such establishments and all parts thereof at all reasonable times for purposes of inspection and enforcement of the provisions of this act, or any other relating to food products. The board may also appoint and designate such person or persons as it deems qualified to make the inspections herein required.

Licenses and Reports of Cold-storage Warehouses.

All cold-storage establishments subject to the proposed inspection should be required to register and take out a license with the State Board of Health. When this commission began its investigation there was no complete list of such establishments in the Commonwealth. The commission has compiled such a list, which is believed to be complete at the present time. One of the first tasks of any board entrusted with the enforcement of cold-storage regulations would naturally be to obtain a complete list of all the plants subject to its authority. This task could be facilitated by a provision of law requiring compulsory registration of all persons, firms or corporations engaged in the business of cold-storage warehousemen, or in the business of refrigerating. This commission accordingly recommends that such registration be enforced by law.

It is also desirable that cold-storage warehouses should be required to make regular reports to the State Board of Health. A requirement of such reports is a feature of the Delaware, New Jersey and New York laws. The Delaware and New Jersey laws require quarterly reports; the New York law requires only three reports annually. The Indiana act provides that records of receipts and withdrawals of all goods held in cold storage shall be kept by the warehousemen and be accessible to the State Board of Health, but no reports to the Board are required. In the last report of the United States Secretary of Agriculture the recommendation is made that cold-storage warehouses be required to send to Washington monthly reports showing the quantity of goods in storage and the movements of receipts and deliveries. The Secretary declares that the affairs of the cold-storage business should have publicity and proposes that this shall be secured through monthly reports, the data of which could then be tabulated promptly and the results given to the public on a previously announced day of the month, somewhat as the crop reports are. This commission is not prepared to recommend a requirement of monthly reports.

In accordance with the general principle adopted in drawing other provisions of the proposed bill,[1] it has been deemed advisable to leave the question of the frequency with which reports shall be required to the State Board of Health. This Board will have opportunity, in the administration of the law, to determine whether the public interest requires that reports be submitted oftener than at quarterly intervals. The commission has decided, therefore, to recommend that quarterly reports from all cold-storage establishments be required in the law, and that the State Board of Health be empowered to require reports to be made at more frequent intervals, if this shall be found to be advisable.

The provisions of the proposed bill embodying these recommendations of the commission are as follows: —

SECTION 2. No person, firm or corporation shall operate a cold storage or refrigerating warehouse without a license issued by the state board of health. Any person, firm or corporation desiring such a license shall make written application to the board, stating the location of its plant or plants. On receipt of the application the board shall cause an examination to be made into the sanitary condition of said plant or plants, and if they are found to be in a sanitary condition and otherwise properly equipped for the business of cold storage, the board shall cause a license to be issued authorizing the applicant to operate a public cold storage or refrigerating warehouse for and during the period of one year. The license shall be issued upon payment by the applicant of a license fee of ten dollars to the treasurer of the commonwealth. In the event that any warehouse licensed under the provisions of this section, or any portion thereof, shall be deemed by the state board of health to be conducted in an unsanitary manner, it shall be the duty of the board to close such warehouse, or portion thereof, until it shall be put in sanitary condition, and the board shall have power also to suspend the license in case the needed changes shall not be made within a reasonable time.

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[1] See page 196.

It shall be the duty of any person, firm or corporation licensed to operate a cold storage or refrigerating warehouse to keep an accurate record of the receipts and the withdrawals of articles of food, and the state board of health shall have free access to these records at all reasonable times. Every such person, firm or corporation shall, furthermore, submit a quarterly report to the state board of health on a printed form, to be provided by the board, setting forth in itemized particulars the quantities of food products held in cold storage. Such quarterly reports shall be filed on or before the twenty-fifth day of January, April, July and October of each year, and the reports so rendered shall show the conditions existing on the first day of the month in which the report is filed. The state board of health shall have the authority to require such reports to be made at more frequent intervals than the times herein specified, if in the judgment of the board more frequent reports shall be needed in the interest of a proper enforcement of this act, or for other reasons affecting the public welfare.

2. MARKING OR TAGGING COLD-STORAGE PRODUCTS.

The proposal of marking or tagging cold-storage products is founded on the idea or theory that the consumer has a right to know whether he is buying refrigerated goods or fresh food, and if the former, a right to know also the length of time during which the goods have been held in storage. A requirement that goods deposited in cold-storage warehouses should be marked or tagged might not convey this information to the ultimate consumer, but it would, at least, carry it one stage along the line of distribution in his direction. In fact, the ultimate consumer is very hard to reach in this case. Many persons never buy food in the market, but obtain it in restaurants, boarding houses and hotels. This class of consumers would still be liable to imposition, even if the most stringent regulations with respect to marking and tagging were enforced in cold-storage warehouses and in retail establishments. A requirement with respect to marking or tagging food products in cold-storage warehouses would, however, at least furnish a working basis for an attempt to develop a more effective method of placing the facts with regard to the food that he buys or eats at the disposal of the consumer.

Testimony of Warehousemen.

The proposal of marking or tagging is admitted by representatives of the cold-storage warehousemen to be reasonable. Mr. Albert M. Read, former president of the American Warehousemen's Association, testified before a congressional committee as follows: —

The Chairman. Now, Mr. Read, what objection would the cold-storage man have to the dating of food supplies that enter into cold storage?

Mr. Read. None whatever.

The Chairman. Then if a shipment of eggs, or of butter, or of meat, or of fish, or of any other food products were to be delivered at the cold-storage warehouse there would be no objection, from the cold-storage warehouseman's point of view, to having the original package, or the article itself, if it can conveniently be done, dated as to the time of entry into the cold-storage warehouse?

Mr. Read. None whatever.

The Chairman. You see no objection to that proposition?

Mr. Read. None whatever.

The Chairman. If goods were so dated on the entry into the cold-storage warehouse, thus giving notice to the buyer at any time during the period of the storage as to the age of the commodity in storage, would it affect the business of the cold-storage warehousemen?

Mr. Read. We think not; and even if it does, we are very willing to do that which will help not only the community, but that which we believe will help the cold-storage warehousemen.

The Chairman. You do not see anything unfair in the suggestion that the purchasing public should be fairly advised of the period of storage of food supplies which are placed upon the market?

Mr. Read. No, sir.[1]

Mr. Frank A. Horne, president of the Merchants Refrigerating Company of New York city, in an address before the convention of the National Poultry, Egg and Butter Association in Chicago, in October, 1911, characterized the demand for legislation that would give information to consumers respecting the age of food products offered for sale as a reasonable proposition. He pointed out the difficulties involved in communicating such information to the consumer in any complete and adequate way, but he recognized that the principle of informing the consumer is a sound one.

It has also been alleged in favor of this proposal that it would benefit the cold-storage interests by creating a more enlightened attitude toward this business, and helping to promote the intelligent consumption of cold-storage products. Mr. Robert M. Allen, head of the food and drug division of the Kentucky Agricultural Experiment Station, put this argument effectively in a statement before the United States Senate Committee on Manufactures, as follows: —

> This labeling will work some hardship, of course, but in the end it will result in bringing to the cold-storage industries confidence of the consumer in this absolutely necessary method of food preservation.
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> There can be no legitimate objection to thus turning the cold-storage problems over by means of the plain label to all of the chemists, bacteriologists, refrigerating engineers, the trade and the

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[1] Report of Subcommittee on Food Storage and Prices, District of Columbia, 1910, pp. 242, 243.

consumer to work out and adjust. And when the merchant is required to give the consumer the facts as to cold storage, it can be depended on that there will be a widespread effort to correct, as far as possible, all of the problems which affect the quality of the products stored and to keep the stored products on the move to the market. . . .

The American cold-storage trade should join in the support of proposed labeling and sanitary provisions of law, for such a proposition is too fair to be successfully defeated in the end. By coming forward with co-operative effort to assist the federal and State governments in the correction of any abuses, and in recognizing the rights which the people who eat stored products have in the matter, the present condition, a growing one, can be turned to good account. On the other hand, if those who see the necessity for certain governmental regulations of the cold-storage business are required to bring forth the worst examples of abuses, as was necessary in the fight for the food and drug laws of the country, such action, while securing the passage of federal, State and municipal cold-storage laws, will at the same time shake the confidence of the consuming public both in home and foreign markets.[1]

In his address before the convention of the National Poultry, Butter and Egg Association, Mr. Horne conceded the possible advantages of the proposal under consideration, from the point of view of the interests of the warehousemen and the dealers. He said: —

While such a law would be of doubtful efficiency, for the reasons stated, and because of the cost of enforcement, it is possible that the very existence of such a statute would affect and control the law-abiding, and the occasional detection of the violators would serve as a warning and bring the careless into line. It must be admitted that if it were possible to effectively convey this information to the consumer, cold-storage products would be used at more reasonable prices, consumption would be stimulated and much advantage would accrue to the handlers of the products, because the people would become familiar with refrigerator goods, knowing that the process was necessary in giving them products out of the season, and ultimately it would disabuse their minds of the prejudice which now exists.

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[1] Report, United States Senate Committee on Manufactures, 1910, pp. 126, 127.

The adoption of a system of marking or tagging cold-storage products, which would identify them in the trade as such, would help to place the sale of such goods on an open and honest basis. The present practice of deceiving the consumer has given rise to widespread ignorance and prejudice concerning cold-storage foods. An absolutely straightforward treatment of consumers, giving them full information concerning the goods, would, if supplemented by systematic educational work to enlighten the public on the subject of cold storage, bring about ultimately an extension of the demand for these products, and would establish all branches of business engaged in their distribution on a firmer footing.

Objections to Marking or Tagging.

In opposition to this proposal various objections have been raised, as follows: —

1. It would be difficult of enforcement, if not entirely impracticable, in the case of some goods. In the case of fish, for example, a law requiring the marking of packages or containers to show the date of entry into storage and the date of withdrawal from storage would encounter serious practical obstacles. Many fish are stored only in bins or stacked in tiers, and are not packed into boxes at all. Moreover, when the fish are sold, many varieties, of different periods of storage, may be put into the same box or barrel in filling the order of a retailer.

This objection was set forth in the testimony of various representatives of the fish interests before the United States Senate Committee on Manufactures, including Mr. E. F.

Case of Cleveland, O., Mr. C. M. Prankard of New York, and Mr. Frank H. Field of New York. Sales sheets were exhibited showing that the average order for fish was under 100 pounds, and that each order included several varieties, as high as six or seven varieties in an order; hence it was declared to be impracticable to label them, as the varieties were caught probably on different days. The total catch in the Ohio waters of Lake Erie, during the nine months' season at an average of 100 tons daily, Mr. Case stated, would amount to about 370,000 tons. Five per cent. of these were frozen or about 18,500 tons, equal to 37,000,000 pounds. The average weight of the fish caught in this part of Lake Erie, he said, would not exceed one pound each. Hence it would mean the labeling of approximately 37,000,000 fish each season. The average quantity frozen in the houses that Mr. Case represented was about 200 tons each season, or approximately 4,000,000 fish. Mr. Prankard called attention to the fact that, in addition to this quantity, about 500 tons of naturally frozen fish are brought in from Canada each year and are handled at Lake Erie points. The fish, it was declared, could not well be frozen in packages or sold in packages. A box of fish might contain twenty-five varieties, or only one or two. Hence every fish would have to be tagged separately in the freezer. This would cause dangerous delay at times, delay that might injuriously affect the quality of the fish before it could be frozen.

Mr. Field, who appeared as attorney for the New York Wholesale Fish Dealers' Association, testified with respect to marking and tagging as follows: —

> Now, a few words on this subject of tagging as applied to fish, and I am going to discuss that from the fish standpoint. There are some fish that are very small. Take whitebait; it takes several hundred of them to make a pound; they are usually served on a

piece of toast, and you eat them heads and tails and bones and insides and everything. It is impossible even to clean them. Now, what is true of whitebait is true in some degree of such fish as smelts, ciscos, blue pike, and other small varieties of fish. Take any fish under a pound; now you take a very small fish of that kind, and if you attempt to tag it in any way you are going to largely increase the cost. . . .

Now let us take up the question of tagging the box or receptacle. The retail dealer very rarely buys as much as a box or a barrel of any one kind of fish. You go into any retail fish store in any city; take it in Washington, or New York, or Chicago, or anywhere,—the fish dealer has to have ten or a dozen varieties or more of fish for his supply. His trade is almost wholly confined to two days in the week. Now, he only gets a few pounds of bluefish, and a few pounds of whitefish, and so on through his supply. Now, then, how is his fish going to be tagged? He hasn't got any original package; it is rare that the retailer has got a single original package of any single kind of fish, and he has got, we will say, fifteen varieties of fish in his store during the week. Now, how in the world are you going to bring the tag that is on the package in the hands of the wholesaler home to the consumer? That wholesaler sells out of a box to everybody until the box is empty, or the barrel. . . . So I do not see how you are going to bring that question home to the retailer, even if you tag the box or the package. You asked if it was any more difficult than a box of cigars. The consumer himself very often buys a box of cigars. The retailer always has his cigars in the original box. He couldn't sell them if he didn't have them that way, but the retailer rarely ever has the original package in his retail store in which the fish were shipped to the wholesaler, or shipped by the producer.

Now, you take it in New York city; the retailers come over with their wagons on the market days to Fulton Market; that is the general designation of that territory where the wholesale merchants are congregated. He goes through the wholesale market to the various stores to find out who has got the best and most reasonable price for the supply of the various fish that he wants, in order to make up this quantity, and he has a number of barrels, generally barrels that he has brought over in his wagon, and he has the fish weighed out of these separate boxes and loaded into his barrels until he gets all the fish he wants, and then he takes them over to his market, and puts them in his ice box, with a few scattered out over his show table and sells his goods. Now, how in the world is that retailer going to have any pretense of tagging in any part of his supply?

The CHAIRMAN. Now, you are not interested in that. We have got to deal with that when we come to the retailers, but that doesn't affect the question of holding them in cold storage, which is the question we are inquiring about.

Mr. FIELD. But it affects this provision of your bill that requires everything to be tagged. Now, we are the handlers of cold-storage quantities of fish; we turn over every week in New York city an enormous number of pounds of fish. Now, we can see no way of working out this problem of tagging that can be even approximately universal.[1]

The difficulties in the way of practical enforcement of a marking or tagging requirement, which have been pointed out, are certainly not insuperable. A reasonably elastic requirement could be adapted, by the authorities entrusted with its enforcement, to the peculiar conditions of the fish-freezing industry and other businesses affected. It would be practicable in any event to mark the bins or rooms in which small fish handled in bulk are stored. When such fish are taken from storage, the box, barrel or other container could be tagged or marked to show the dates of receipt and withdrawal. There would still be some difficulty here if fish that had been in storage for different periods were packed in the same container. This could be avoided, however, by requiring such container to bear the date of receipt of the consignment of fish that had been longest in storage. Undoubtedly a provision of law requiring the marking or tagging of cold-storage products, either on the containers or in connection with the articles, would be possible of enforcement.

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[1] Report, United States Senate Committee on Manufactures, 1910, pp. 224, 226, 227.

2. It would involve large additional expense, which would necessarily be added to the price of the goods, thus taxing the consumer. Mr. Charles H. Utley, president of the Quincy Market Cold Storage and Warehouse Company, has raised this objection. Before the Senate committee he stated that marking or tagging would not be difficult, but would be very expensive. He testified: —

> The Chairman. Well, is there any difficulty in branding the packages, whether they be box or bag, or the stem of a banana bunch, or anything of that kind? It is easy enough to provide that everything shall be sold out of packages. Now, is there any difficulty in branding the packages?
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> Mr. Utley. There is no difficulty, but it will entail a very great expense to somebody.
>
> The Chairman. You think it will?
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> Mr. Utley. Yes, sir.[1]

This argument is not weighty, as the expense of marking or tagging would not be "very great." The cold-storage warehouses already have a system of stamping containers with a number upon receipt into storage. This number is recorded on the books, and reference to it shows the date of receipt. There would be little extra expense involved in marking the containers with the date of receipt. A requirement of marking with the date of withdrawal would entail more trouble and expense. But experience with the New York law shows that this difficulty is not serious. Under the operation of this law requiring goods to be marked with the dates of both receipt and withdrawal the Merchants Refrigerating Company has had to employ one extra clerk in its New York warehouse to attend to the marking.

3. It would be misleading, since the time during which goods are held in storage is no index to their quality; goods

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[1] Report, United States Senate Committee on Manufactures, 1910, p. 136.

held for nine or ten months might be far preferable to goods stored for only two or three months. The decisive matter in determining the quality of cold-storage products is not the length of the storage period, but the grade and condition of the goods when placed in storage, especially their seasonal character, and the way in which they are handled before and after storage.

Mr. Louis F. Swift of Swift & Co., Chicago, states regarding the alleged misleading effect of marking or tagging: —

> We feel quite sure it would mislead the public, because some of our meats when put away in the season of prime quality will be better, even though a month or two longer in storage, than fresh goods put away that were not of quite so good quality.[1]

The popular opinion that eggs stored for a short period are necessarily better than those stored for a longer time is declared by government experts to be a fallacy. In a discussion of the "Effect of the Present Method of handling Eggs on the Industry and the Product," in the Yearbook of the Department of Agriculture, 1910, the fallacy of this opinion is thus expressed: —

> It does not pay to put eggs into cold storage unless they are large, clean, fresh, sound shelled and well packed. It costs just as much to carry poor eggs as good ones, and poor eggs deteriorate much faster in cold storage than good eggs; hence they are fairly sure to be a losing proposition. The great bulk of the eggs which go into storage are from the early spring lay, — the earlier, after the danger of frosting is over, the better. By the latter part of May warm weather is apt to interfere with the freshness and high quality, and the comparatively few summer eggs that are stored last must be taken out of storage first, if they are to stand well on the market.
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> Here is a condition of affairs that is directly opposed to the usual point of view of the consumer. If cold-stored eggs are to be used

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[1] Hearings, United States Senate Committee on Manufactures, 1911, p. 408.

at all, the uninformed buyer demands those in storage for the shortest time, thinking he will gain quality thereby. Really, the average March or April egg is commonly in better condition in the succeeding December and January than are the eggs stored in June and July. The reason is not far to seek, if one remembers the treatment the warm weather egg gets on its way to market, and the fact that cold is an excellent preservative of freshness in perishable produce, provided it goes into the cold chamber in the best condition.[1]

It is alleged in this connection that the date of killing, catching, gathering or packing is of more significance as an indication of the quality of a food product than the date of deposit in storage. The latter date alone does not show the length of time that has elapsed between the slaughtering or collecting of the food product and its receipt into the cold-storage warehouse. The length of such period, however, is declared to be an essential element in determining the quality of the food. Of two articles bearing the same storage date, one might be far inferior simply because it had been kept a longer time before reaching the freezer or refrigerator.

The contention that the time of storage is misleading to consumers is true to a certain extent. It may be argued on the other side, however, that it is desirable to familiarize the public with the facts of cold storage in the interest of the business itself. If the time of storage is not a fair index of quality, the consumer ought to be enlightened on this point.

The argument that the date of production is more important than the date of storage also has force. But it is obvious that State legislation alone could not possibly carry into effect a requirement of marking with the former date. The great bulk of the chief cold-storage products consumed in this State is produced outside of its boundaries. Mr. J. M. Thomas, wholesale butter merchant, told this commission that about 90 per cent. of the butter and eggs consumed in Massachusetts is supplied from outside the State. A provision for marking with the date of production could be enforced properly only through national legislation. The Heyburn bill for the regulation of cold storage, before the United States Senate Committee on Manufactures, contains such a provision. The bill provides that any article of food which has been held in cold storage, or the package containing it or from which it is sold, which shall fail to bear a label stating the date of production, killing, packing or manufacturing, as well as the period of time during which the article has been held in cold storage, shall be deemed to be misbranded. Obviously, this is a matter for national and not for State action. The State, however, can enforce a requirement of marking cold-storage products with the dates of entry and withdrawal, and the advantages of such a provision, inadequate as it might be in giving information to the public, are sufficient to warrant its enactment.

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[1] Yearbook, United States Department of Agriculture, 1910, p. 472.

4. It would be useless in any event, since no practicable system of marking or tagging would convey information to the ultimate consumer. Packages and containers are broken up and their contents are graded and assorted by the retailers when the goods are placed on sale.

The difficulties on this score are pointed out by Mr. F. G. Urner. He declares: —

> But even if labeling food with a statement of the period of its storage were sufficiently useful to warrant the labor and expense of the labeling, and of the enforcement of a branding law, which would be extremely difficult, this usefulness would depend entirely upon the ability to carry to the actual consumer the information contained on the labels. The branding of wholesale containers, in which alone goods are handled in interstate commerce, would not

accomplish this, because, in a majority of cases, wholesale packages are broken up and their contents graded and repacked by intermediate handlers for retail distribution.

The information of length of storage-period could be conveyed to the purveyor to family and hotel or restaurant trade with certainty only if each unit of food were labeled, and the labor and cost of this would be incalculable. Even then, in the case of restaurant and hotel patrons who see the food only when cooked and served, it is difficult to conceive any practical means by which the information on the label could be conveyed to them.[1]

The difficulty of conveying information to the consumer has been recognized in previous connection. A marking or tagging requirement applying to the warehouses could be supplemented, however, by regulation of retailers designed to carry the information a stage further in the direction of the consumer. The proposed requirement would afford a basis for working out an adequate system of identifying cold-storage products in the trade, thus preventing the practice of deception on a large scale.

5. It would be unconstitutional, involving unwarrantable interference with the liberty of the citizen in disposing of his property. The constitutional objection is thus presented by Mr. Field in his testimony before the United States Senate Committee on Manufactures: —

Mr. FIELD. I refer to one of our leading cases there, People *v.* Hawkins, which was the case of requiring prison-made goods to be stamped "Convict-made," and the whole question is discussed there, and I just want to read one or two passages. It is taken up by the New York court of appeals on the proposition that it deprives a citizen both of his liberty and property —

The CHAIRMAN. Give the reference to the book and page.

Mr. FIELD. One hundred and fifty-seven New York, at page 1. Now he ends up his discussion of the case by saying: "Any attempt to carry the police power to such an extent as to require the owner of an article of property kept for sale, such as a scrubbing brush, to label it with the history of its origin, and to indicate the place where it was made and the class of workmen that produced it, and to enforce such regulations by the aid of the criminal law, must be regarded as an inexcusable and intolerable invasion of the rights and liberties of the citizen." Now, the proposition is very fully discussed there that the State cannot, under the guise of a health law or labor law or any other kind of a law, interfere with the absolute liberty of the citizen in disposing of his property unless they can show that it is actually a measure demanded in order to protect the health of the people, or concentrating its interests under the proper definitions of the police power.

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[1] Report, United States Senate Committee on Manufactures, 1910, p. 214.

Now, if it is true, as we contend here, that the length of time that fish is stored, if it is properly stored, has absolutely no relation to health, then this kind of legislation is unconstitutional.[1]

There is little doubt that a statute requiring marking or tagging, if properly drawn, would be held to be constitutional. It can be sustained as a reasonable exercise of the police power to prevent deception of the public. The principle of such regulation has, in fact, already been sustained in the case of the laws relating to the sale of oleomargarine, renovated butter, imitation cheese and skimmed milk. The analogy of cold-storage products and prison-made goods, suggested by Mr. Field, does not hold. In the case of the latter no question of public health is involved. The labeling is demanded in order to stigmatize such products and benefit a certain class in the community. In fact, it is an inverted application of the union-label principle. The proposal to require the labeling of cold-storage products is of an essentially different character. The constitutional argument against this proposal may be dismissed as not deserving serious consideration. The constitutionality of the marking provision in the New York law has been sustained by the court of special sessions of New York city, and by other lower courts in the State, in prosecutions brought against violators of this requirement by the State Department of Health.

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[1] Report, United States Senate Committee on Manufactures, 1910, pp. 231, 232.

Provisions for Marking or Tagging in State Laws.

The existing provisions with respect to marking or tagging in the laws for the regulation of cold storage, passed recently in various States, are much alike. The New Jersey provisions require that articles of food or packages containing them shall be branded, stamped or marked in some conspicuous place, upon receipt into cold storage, with the day, month and year; and, further, that no goods that have been kept in cold storage outside the State shall be received into New Jersey warehouses unless branded, stamped or marked with the day, month and year when placed in cold storage in the other State, or unless the consent of the State Board of Health has been obtained for the receipt of the goods. The provisions of the Delaware act are similar, with the exception of the requirement concerning goods coming from other. States, which does not appear in this act. The New York act requires that goods shall be marked with the date of withdrawal from storage, as well as the date of entry. The Indiana law also requires marking with both dates, and prohibits the receipt of goods that have been stored outside of the State, unless marked as provided in the act.

Three bills providing for the marking or tagging of cold-storage products were introduced in the last Legislature in this Commonwealth, namely, House, No. 261, House, No. 262, and House, No. 1328. The first provided that articles of food placed in cold storage should be marked with the date of receipt. The second required cold-storage warehousemen to affix to the containers tags bearing the date of receipt, and to add the date of withdrawal when goods were removed from storage; the defacement or destruction of the tag or the separation from the container prior to sale by the retailer was prohibited; and dealers were required to display the tags to prospective purchasers. The third required containers to be marked with the dates of both receipt and withdrawal; retailers offering cold-storage goods for sale were required to display a statement that the goods were taken from cold storage, and giving also the length of time during which they had been so held.

Date of Delivery Important.

The New York and Indiana acts require marking with the dates of both entry and withdrawal, while the New Jersey and Delaware acts require the date of entry only. In this connection it has been argued that, if a proper system of inspecting goods upon entering storage were established, and a maximum time limit for storage were fixed, the question of the length of time that goods have been held in storage would become relatively unimportant. Inspection and time limit, it is contended, would afford a reasonable guarantee of the proper condition of goods taken from storage; under such regulations it would be sufficient simply to mark the goods with the date of receipt into storage. This date is, of course, essential to the enforcement of any time-limit provision, but the date of withdrawal is held to be unnecessary and superfluous.

The chief objection urged against a requirement of marking with the date of withdrawal is that it would double the expense, and would cause trouble and delay in the delivery of goods. This is true. It would manifestly be unreasonable to impose this additional expense and inconvenience unless there were some real advantage to be gained by the double dating. Is there any such advantage?

The president of a large cold-storage warehouse company, operating plants in New York and New Jersey, stated to members of this commission that, if any marking at all is to be required, it is better that both dates should be placed on the goods. He declared that he preferred the marking provision of the New York law, which requires both dates, rather than the New Jersey act, which requires only the date of entry. The reason that he gave was that the double dating acts as a protection for the warehouseman, since it shows whether goods that may be found to be in unfit condition in retail establishments have been held by the dealer for a long time after being taken from storage. This opinion, coming from a warehouseman who has had experience under both systems of marking, is very significant. Dr. W. D. Bigelow, assistant chief of the Bureau of Chemistry, United States Department of Agriculture, regards it as important to require marking with the date of withdrawal as well as the date of receipt, for reasons similar to those of the warehouseman whose opinion has just been cited. Dr. R. B. Fitz-Randolph, the efficient chief of the division of food and drugs of New Jersey, who has charge of the enforcement of the cold-storage law of that State, is of like opinion. In a letter to this commission, dated December 28, written in reply to an inquiry as to whether he believed it to be desirable that a cold-storage law should require the date of withdrawal as well as the date of receipt to be marked upon the goods, he stated: —

As you know, the law in this State requires only the date of entrance to be marked, while the law in New York State requires both dates of entrance and withdrawal. In my opinion there are certain advantages in having the date of withdrawal upon the goods. Most of the deterioration which goes on in cold-storage products occurs either before the goods gets into storage or after they are removed from storage, and if the date of withdrawal is upon the package, the purchaser of the goods has an opportunity to ascertain how long they have been out of storage.

I intend at the next session of the Legislature to endeavor to have our act amended in such a way that the date of withdrawal will be required.

The New York State Department of Health also regards the date of withdrawal as important.

After weighing carefully all the considerations bearing on this question, this commission has come to the conclusion that there are sufficient reasons for requiring the date of withdrawal, as well as the date of receipt, to be marked on goods that pass through cold-storage warehouses. The system of double dating gives more definite information about the commercial history of the product, helps to fix the responsibility in the case of spoiled goods, and in practice such a provision would tend to discourage retailers from holding goods for long periods after removal from storage, and thus would help to get them to the consumer in better condition.

Recommendation of Legislation.

It would appear to be sufficient to frame the requirement as to marking or tagging in broad terms, leaving the details of enforcement to the State Board of Health. The Board should be given power to prescribe the form or method to be adopted. A provision drawn in general terms could be enforced by the Board, with proper regard for the different conditions of various branches of the provision business, in such a way as to entail a minimum of trouble and expense while accomplishing the end sought by the regulation. The clause of the bill relating to marking and tagging, drawn in accordance with the conclusions of the commission as here stated, reads as follows: —

Section 4. All articles of food when deposited in cold storage shall be marked plainly with the date of receipt on the containers in which they are packed, or, if not packed in containers, on or in connection with the articles, and when removed from cold storage shall be marked plainly with the date of withdrawal, in accordance with such forms as may be prescribed by the state board of health, under the authority hereinafter conferred.

3. QUESTION OF TIME LIMIT.

Limitation of the time of storage is a feature of all the acts thus far passed for the regulation of cold storage. The general objects which such a provision is designed to accomplish are: first, to protect consumers against bad food by preventing the storage of goods for such periods as to produce deterioration dangerous to health; second, to protect consumers against high prices by preventing manipulation of the market.

A time limit seems desirable as supplementary to the provisions for the inspection of cold-storage products. It is not practicable to examine each individual article that goes into storage, and thus to guarantee absolutely the proper condition of all goods placed in the warehouses. A time limit, supplementing the inspection provisions, would afford an additional measure of protection to the public against abuses arising through undue prolongation of the period of storage. This is the health reason for a time limit. Moreover, a time limit would prevent the retention of goods in storage from one year to another, compelling them to be taken out of the warehouses, as a general practice, before the next seasonal supply comes in, thus tending to make prices lower to consumers. This is the economic reason for a time limit.

If the limit were made long enough to enable dealers to carry over goods from the season of scarcity to the season of plenty within the same year, it would not interfere with the legitimate operations of the business. The percentage of goods carried in warehouses for more than one year at the present time is comparatively small. In the warehouses of the Quincy Market Cold Storage and Warehouse Company the percentages of goods on hand Nov. 20, 1911, shown by the books to have been stored one year, were as follows: poultry, less than ⅓ of 1 per cent. in storage a year; butter, less than 3¼ per cent. in storage a year; cheese, less than 3½ per cent. in storage a year; meat, less than ⅖ of 1 per cent. in storage a year; eggs are never held by this company for more than a year. The last report of the United States Secretary of Agriculture states the percentages of goods held in cold storage longer than twelve and one-half months, as shown by returns from warehousemen, as follows: fresh beef, ½ of 1 per cent.; fresh mutton, 6/10 of 1 per cent.; poultry, 2/10 of 1 per cent.; butter, 6½ per cent.; fish, 13 per cent.

Finally, not the least of the advantages of a time limit is that it would create a greater degree of public confidence in the cold-storage business, allaying apprehension and suspicion with respect to the length of time during which goods are held in storage, and thus would tend to increase the intelligent consumption of cold-storage products, to the advantage of the business and the public alike. The "psychological" influence of the existence of a time limit, as this factor may be termed, would be distinctly beneficial to all concerned.

Critical Review of Objections.

Many objections have been urged against the proposal of a time limit. These may be classified as follows: —

1. It would be unscientific.

The time of storage is not a sure index of the quality of the product and its fitness for consumption. All depends here on the selection and preparation of the goods that go into storage. It is contended, furthermore, that there is not at the present time sufficient knowledge with respect to the effects of cold storage and the limits of proper preservation to enable the Legislature to fix scientific limits for different commodities. In his testimony before the United States Senate Committee on Manufactures, Mr. Kenneth Fowler, representing the fish industry, testified regarding the inadequacy of the time test of fitness of products for consumption as follows: —

Senator REED. Your position, then, is that the length of time the product has been in cold storage does not furnish any test as to its being healthful or unhealthful; that that is not a test?

Mr. FOWLER. No, sir; I think the real factor is the condition of the stock when it goes into cold storage. That is the main factor, and the second factor is how it is handled after it comes out of cold storage.

Senator REED. In other words, if I understand you — and I put the question in rather a leading form — your position is that a fish might be destroyed, or might be made unfit for food and unhealthful, by improper handling within a few hours, and possibly in a good deal less time than that; and that where fish went into cold storage in an improper condition, it would always be in an improper condition, whether it was kept there three days, three months or three years?

Mr. FOWLER. Absolutely.

Senator REED. It would still be improper for food?

Mr. FOWLER. Yes, sir.

Senator REED. But that if it goes into cold storage in a good condition, and then the temperature in the cold-storage plant is allowed to vary and get too high, that it might be destroyed in that cold-storage plant, and that that might be done in a few days' time or a few weeks' time; and, on the other hand, if it goes in in a proper condition, and is kept there at a proper temperature, it will keep indefinitely, and be in good condition at least up to a period of eighteen months that you spoke of; you have practical knowledge of that?

Mr. FOWLER. Yes, sir.

Senator REED. Now, if that is true, the length of time does not furnish the proper test as to healthfulness or unhealthfulness, — the length of time it is kept in cold storage?

Mr. FOWLER. No, sir.

Senator REED. Now, can you suggest to this committee what test could be adopted which would assure, as nearly as possible, the proper condition of these products when they have reached the consuming public; what would be the test and what would be the method?

Mr. FOWLER. The only test that seems to us to be at all practicable is inspection, — inspection at the warehouses.

Senator REED. When the goods go in?

Mr. FOWLER. When the goods go in.

Senator REED. Or when they come out, or both?

Mr. FOWLER. When they come out, also — both conditions. In fact there should be inspection at all times at the warehouses.[1]

In this connection the time limit is declared to be deceptive for purchasers of cold-storage products. The limit, it is said, would appear to guarantee the proper condition of all goods taken from cold storage within the legal period. This would mislead consumers, it is argued, because goods withdrawn from storage within the limit might, nevertheless, be of inferior quality, or even unfit for consumption, on account of improper handling or long keeping before receipt at the warehouses.

The argument that a time limit is unscientific has some force, but it does not prove the inexpediency of a time limit, if combined with a well-organized system of inspection. It is true that any time limit which might be set, in the existing state of information with respect to the keeping powers of different products, would be more or less arbitrary, and in this sense unscientific. There appears to be general agreement, however, that a progressive deterioration takes place in goods placed in cold storage. The process of refrigeration retards the deterioration of food products, but does not prevent it absolutely. Obviously, there must be some time beyond which storage should not be continued, if the goods are to reach the consumer in proper condition. A maximum time limit of storage, not so short as to interfere with the proper function of this method of food preservation, appears, therefore, to be desirable, in connection with inspection, as a further measure of health protection. Even if the precise limits of preservation cannot be determined for different kinds of goods, it seems to be advisable to set a maximum limit for all, in order to guard against dangerously prolonged storage.

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[1] Hearings, United States Senate Committee on Manufactures, 1911, pp. 164, 165.

2. It would be discriminative.

A time limit would interfere with the right of the owner's control in the case of one class of property, while leaving it unrestricted in the case of other classes. If the time during which a man may hold goods in storage is to be limited, the restriction should be extended to goods preserved in other ways than by the refrigeration process. In his testimony before this commission, Mr. Charles H. Utley stated this objection thus: —

> A time limit is illogical, as it is proposed to impose certain restrictions and regulations applicable to goods held in cold storage, where they receive the best possible care, and are under conditions best adapted to their preservation, and no similar restrictions or regulations are applicable to the same goods held in ordinary storage, or when some other method of preservation is employed.

This objection is not well founded. There is stronger reason for imposing a time limit in the case of goods deposited in cold storage than in the case of goods held or preserved otherwise. The danger to public health through unduly long storage appears to be greater in the case of the refrigeration method of preserving perishable food products than in the case of other methods of food preservation. Prof. William T. Sedgwick was asked the question, when he testified before the commission: "Do you see any reason for limitation of food preserved by cold storage more than on foods preserved in any other form of preservation, canned, dried or anything else?" His reply was: "I think there would be more reason for limitation with fresh foods than with sterilized foods; *a priori,* I think that they are more subject to deterioration when held in cold storage than when sealed up with solder."

3. It would be dangerous.

The imposition of a time limit in the case of cold storage would form a precedent for wide-reaching interference with business operations. The principle might be extended to restrict the holdings of agricultural and manufactured products of all kinds, and even of real estate. Mr. Utley declares: —

> It is a bad principle to introduce in legislation and likely to be far-reaching in its future application, — the principle involved being practically restricting or limiting the time for which an owner can retain control over his property. There can be no logical reason against the application of this principle, after it has once been established, to all articles of merchandise or property of any kind. . . . There would be equally as good reason to limit the ownership of any agricultural or manufactured product to a restricted time as to place this restriction upon the ownership of articles enumerated in the proposed bill; and it would be just as reasonable to assert that wool held a certain length of time should then be considered cotton as to class goods as adulterated after a certain date that were pure and unadulterated a day prior to this date.[1]

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[1] Hearings, United States Senate Committee on Manufactures, 1911, pp. 106, 107.

This argument is overdrawn. The case under consideration should be dealt with on its merits, regardless of other conceivable applications of the same principle. It is not a conclusive objection to the application of the principle in this case to argue that it might be applied unreasonably and injuriously in other cases. The argument at best is not entirely consistent with the preceding, for in that case it was contended that the imposition of a time limit for cold storage would be discriminative, because it would not be applied to all classes of commodities; and in this case it is reasoned that the restriction would be objectionable because it might later be extended to include other classes of commodities.

4. It would be unnecessary.

The regulation of the time of storage is superfluous, because the business interest of dealers leads them to place their goods upon the market in the season of scarcity, when they are in greatest demand, in order to realize the highest prices and avoid the trouble and expense of long storage. The fact is emphasized that it is not the practice of dealers to carry goods over into the next season, since the cost of carrying is too great. Mr. F. J. Urner puts this objection as follows: —

> It must be evident that, concerning perishable food products of seasonable production, or of greatly varying production from season to season, each year's product must, as a general rule, be consumed within the year, or before the recurrence of the next season of maximum production. Values are naturally the lowest and qualities best in the season of greatest production; goods carried from one season of maximum production to the next must be sold in competition with fresh goods of the lowest natural value and of greater intrinsic worth because of their freshness. And the cost of carriage, under these circumstances, added to the impaired value of year-old goods, makes a certain loss on such, as a general rule. Instances where goods are carried over from one season past the next season of flush production

> are rare and exceptional, although this course may sometimes be taken with comparatively small quantities in the hope that the next season of scarcity may lessen or obviate the loss.
>
> I respectfully submit that in order to realize any higher price for stored goods than measures their market value when stored, products must be carried to a season when fresh supplies are scarcer. Consequently, the fundamental incentive among storers of goods, the production of which is variable, is to market reserve stocks when consumers have greater need of them, this being the only course that can result in profit. It follows, therefore, that the interests of storers compel the marketing of reserve stocks at such times as the public necessities most require, and that no limitation of the period of permissible storage is necessary to protect the public interests so far as the effect of holding upon market prices is concerned.[1]

Similarly, Mr. Carlton M. Prankard, representing the New York Wholesale Fish Dealers' Association, declared before the United States Senate Committee on Manufactures: —

> We do not need any limit; that matter will take care of itself, because the storage of fish costs money. Fish are frozen and cared for in cold storage, and there is a charge to carry them there, and we cannot keep them, if we had the disposition to keep them, for a number of years; we cannot do it. They would eat their heads off. There is the matter of depreciation, insurance and storage charges, which make the charges more than the value of the goods.[2]

In answer to this argument, it may be observed that, while it is not the general practice to carry goods for so long a time that they become greatly deteriorated, it is now possible to do so, and undoubtedly this occasionally happens. The possibility of abuses of this kind, even in rare instances, should be prevented by legislation. The owner of one of the smaller cold-storage warehouses in this State admitted to members of this commission that goods were sometimes stored with him by merchants, and left in storage so long that their condition became bad. He stated that he would be glad to have a law passed which would compel his customers to take out their goods within a reasonable time. Abuses of this sort may rarely occur in the larger warehouses, but the fact that they are possible in establishments that are not carefully managed constitutes a reason for restriction of the storage period.

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[1] Report, United States Senate Committee on Manufactures, 1910, p. 212.

[2] Hearings, United States Senate Committee on Manufactures, 1911, p. 25.

A time limit, furthermore, would be regarded by the public as affording protection against attempts to corner the market on perishable food products. There is undoubtedly a conviction in the popular mind that it ought not to be permissible to carry goods over from one year to another, — that each market year should clean up its own product, and settle its own account. This idea is a reasonable one. A seasonal limit for storage would satisfy this demand on the part of the public.

A time limit would undoubtedly be welcomed by the great body of consumers, as affording at least a partial protection against abuses generally believed to exist in the cold-storage business. It would be looked upon as a safeguard against injury to public health and manipulation of food prices through abuse of cold-storage facilities. The cold-storage business and the related interests should on their part welcome the assistance which such regulation would give them in securing the confidence of the public. A time limit would relieve the business of much of the suspicion and prejudice now attaching to it. It would help to place cold storage on a broader and firmer foundation, and thus greatly enlarge its possibilities for good.

5. It would be unconstitutional.

The imposition of a time limit of storage, regardless of the condition of the goods at the expiration of the designated period, would interfere with the property rights of the individual in an unwarrantable manner. The owner of perishable food products has a right to hold them in storage as long as he may wish, provided that they are not in a condition dangerous to health. The constitutional objection to a time limit was brought to the attention of the commission by Elbridge R. Anderson, Esq., at one of its hearings. He stated: —

> Any law fixing a time limit that does not provide compensation will be an unconstitutional law. I don't say that if fish are found unfit for food at any time, — actually unfit for food, — they may not be taken, but if they are fit for food they are just as much my property under the Constitution as they ever were, and you haven't any right to take that property away from me any more than real estate.
>
> QUESTION. Then you mean to say that the Legislature of this Commonwealth cannot constitutionally enact a law which will say that fish cannot be kept in cold storage a period of over two years, and at the end of that time cannot be sold for consumption?
>
> I believe that is so, providing the fish is fit for food at that time.

There can be little doubt that a law fixing a reasonable time limit for the retention of food products in cold storage, on the ground that unrestricted storage is dangerous to the public health, would be held to be constitutional. It could be sustained as a legitimate exercise of the police power for the protection of public health. If the law went further, and provided for the confiscation of goods at the end of the time limit regardless of their condition, or for their sale at auction by summary process, there would be serious question as to the constitutionality of such provisions. But a simple limitation of the time of storage would appear to be clearly constitutional as a health measure.

Proper Length of Time Limit.

The desirability of fixing a time limit for the retention of goods in cold storage having been decided, the question as to the proper length of the permissible storage period next arises. Two considerations are fundamental to the determination of this point: —

In the first place, the time limit should not be made so short as to interfere with the legitimate function of cold storage in distributing the supply of perishable food products evenly over the market year. That is to say, it should not be shorter than the period intervening between the seasons of abundant production. Any limit shorter than this period would curtail the volume of production, restrict the supply in time of scarcity, thus increasing prices and injuring consumers, as well as interfering with the legitimate development of the business.

Of course, if it should appear in the case of any food product that preservation for a period covering the interval between seasons of abundant production is impossible by refrigeration methods, a shorter limit of storage would be demanded in the interests of the public health. But, in the absence of need of restriction on health grounds, it is obvious that the limit should not be made shorter than the interval between the flush seasons.

In the second place, the time limit should not in any event be shorter than the period during which the goods, if properly handled, could be kept in wholesome condition by the cold-storage process. The real object of any legislation on this subject is to protect the consumer. No restrictions should be imposed upon the cold-storage business that cannot be justified as tending to afford such protection.

A limit of twelve months at once suggests itself as a natural one, — natural in the sense that it covers the span of the seasons. This twelve-months' limit must be tested by the two considerations which have just been stated.

It has been pointed out that the time limit should not be made so short as to interfere with the proper function of cold storage in carrying over products from the season of abundance to the season of scarcity, unless the protection of the public health requires a shorter period in some cases because of the impossibility of preserving the article beyond a certain time. On the other hand, it seems clear at once that the limit should not be made longer than one year, for it is not a proper function of cold storage to carry over goods from one year to another, but simply during the period from the flush season through the short season. The storage of goods through the short season is beneficial to consumers, giving them more food, better food and cheaper food, and interference with such storage would be injurious to consumers in the long run, giving them less food, poorer food and dearer food. But the general extension of storage from one year into the next year would be prejudicial to the interests of consumers, as the retention of food in the warehouses beyond the period of shortage would tend to make food scarcer, quality poorer and prices higher. It appears to be generally agreed that storage for longer periods than one year is not advantageous even to dealers, except possibly in very rare instances. The opinion has been frequently expressed by witnesses before investigating committees that the refrigerated products of one year should not be carried over to compete with fresh products of the next year, but should be closed out before the beginning of the succeeding flush season. This opinion is well founded.

The decisive question, therefore, with respect to the adequacy of a twelve months' limit is whether on health grounds any reason exists for fixing a shorter period than one year in the case of any of the commodities to be subject to the restrictions of the proposed act. That is, are all these commodities capable of being preserved in a wholesome condition for at least twelve months? Or is there danger of deterioration in the case of any of them, such as would make a shorter limit advisable in the interest of the public health?

The answer to this question arrived at by this commission is in brief: —

The results of scientific investigation into the effects of cold-storage upon quality and wholesomeness of food products, as well as the experience of cold-storage warehousemen in the handling of goods by the refrigeration process, afford no reason for fixing a shorter time limit than one year, except possibly in the case of eggs.

Scientific and Practical Testimony.

In determining the proper time limit for the storage of poultry, butter and eggs, the experiments conducted during the last six years by experts of the United States Department of Agriculture furnish authoritative data. These experiments have not been extended to include meat products and fish. In the case of these commodities, however, valuable expert testimony from other sources is available.

Poultry. — Dr. M. E. Pennington, expert of the Department of Agriculture, states unqualifiedly that her experiments have not brought to light any facts that would justify a shorter limit than twelve months for poultry. It should be remarked here that Dr. Pennington regards the condition of poultry and other products when deposited in cold storage as far more important in relation to the wholesomeness of the goods when they reach the consumer than is the length of time of storage. She testified before the Senate Committee on Manufactures as follows: —

Senator CUMMINS. I take it from your explanation . . . that what we most need is some regulation that will ensure proper handling of poultry before it is committed to cold storage?

Dr. PENNINGTON. Yes, sir, we need it.

Senator CUMMINS. Rather than fixing the limit of time during which it may be kept in cold storage?

Dr. PENNINGTON. The condition when it enters the warehouse is more important.[1]

Dr. Pennington, in her further testimony, states in substance that poultry properly prepared for storage and kept at the right temperature during the period of refrigeration is wholesome and palatable at the end of twelve months; but that if storage is prolonged beyond a year the changes that take place in the poultry accelerate, and it becomes decidedly less palatable from twelve months to sixteen months, — if not positively unwholesome. The following extracts from her testimony present an adequate statement of her views on these points: —

Senator CUMMINS. Then I will put the question as to meat kept for twelve months, hard frozen. Would a chicken so kept, and eaten at the end of twelve months, be injurious to the health of the person who ate it?

Dr. PENNINGTON. I have eaten many of them and found them very palatable.

Senator CUMMINS. But scientifically you know of nothing, that is, you know of no change that has taken place that would result in injury to the person who ate it?

Dr. PENNINGTON. I have not been able to find any change which would, with our present knowledge, be called injurious. . . .

Senator OLIVER. Does your experiment show that after about twelve months there appears to be a radical change, both in the muscles and in the fats?

Dr. PENNINGTON. The changes appear to accelerate.

Senator OLIVER. That is what I supposed.

Dr. PENNINGTON. I should scarcely call them radical by comparison with the changes which occur at ordinary temperatures, but there is a distinct acceleration between twelve and sixteen months.

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[1] Hearings, United States Senate Committee on Manufactures, 1911, p. 70.

Senator CUMMINS. That is, from twelve to sixteen months the acceleration is most notable. What is the effect upon the wholesomeness of the chicken as food brought about by increase in the acid value?

Dr. PENNINGTON. I cannot tell you exactly what the effect on wholesomeness would be if the acidity became very great. So far as I am aware, it has not been worked out. The taste, finally, as the acid value increases, becomes so unpleasant that one does not eat it.

Senator CUMMINS. It becomes less palatable?

Dr. PENNINGTON. It becomes less palatable.

Senator CUMMINS. Do you know whether the increase of acid value tends to make the food unhealthy or unwholesome?

Dr. PENNINGTON. I cannot tell you. . . .

Mr. LITTLEFIELD. You have not demonstrated, even at the end of sixteen months, to an extent that would enable you to say, as a scientific proposition, that the food had become unwholesome or that the product was unfit for food?

Dr. PENNINGTON. Not positively. It has become decidedly less palatable. . . .

Senator CUMMINS. On what panel in the right-hand (storage) column would you, as far as the wholesomeness is concerned, compare the ordinary chicken brought in from the country and sold at retail in the city or town? . . .

Dr. PENNINGTON. It is ordinarily of a lower grade than would be represented by any of these panels, unless possibly the sixteen months. I think many of the chickens would be of a lower quality even than that expressed by sixteen months.

Senator CUMMINS. So, as a whole, you think if we were eating altogether chickens that had been hard frozen for sixteen months, we would be eating better food than our forefathers and foremothers handled in the ordinary way; that is your conclusion, I take it.

Dr. PENNINGTON. If the poultry had been properly handled before it is hard frozen, and our entire supply should consist of such poultry, I think it would be better poultry than any we have been accustomed to heretofore, and better than most of what we have on our markets at the present time.[1]

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[1] Hearings, United States Senate Committee on Manufactures, 1911, pp. 61-63.

At a conference with members of this commission, Dr. Pennington confirmed this opinion with respect to the desirability of a twelve months' limit for poultry. She stated: —

> My reasons for believing in a twelve months' storage period are based very largely on the result of laboratory work, which shows that up to the twelfth month there is comparatively little change in poultry. After twelve months, however, there seems to be a very decided change.

The testimony of practical business men reinforces the opinion of scientific experts that poultry may be preserved in a wholesome condition for at least twelve months. Mr. Henry Dowie, president of the National Poultry, Butter and Egg Association, gave a significant illustration before the Senate committee. In the spring of 1911 the United States government bought some cold-storage poultry. The inspectors who selected the poultry looked at two lots of poultry that had been frozen and held in cold storage for different periods. They finally chose sixteen months' refrigerated poultry in preference to the other kind, which had been in storage for only a few months; Mr. Dowie stated that in his opinion the inspectors exercised good judgment, as the sixteen months' refrigerated poultry was really of better quality.

The evidence is conclusive that refrigerated poultry can be kept in proper condition for at least one year.

Eggs. — The experiments with reference to the effects of cold storage on eggs were also conducted by Dr. Pennington. Before the Senate committee, Dr. Pennington stated that an egg ordinarily would not keep in good condition in refrigeration for more than ten months, — between nine and ten months generally, — and she added that it must be an extra good egg that will hold in condition for ten months. Dr. Pennington, however, stated further that there is no need of fixing a time limit for eggs shorter than for poultry, "because eggs will regulate themselves." Her testimony on this matter is as follows: —

Dr. PENNINGTON. The investigation or study of eggs has been practically along the same lines as the study of poultry. Eggs are more difficult to handle, if anything, and keep in good condition than poultry. Nature has set a limit on eggs herself. An egg ordinarily will not keep in good condition under refrigeration for more than ten months, — between nine and ten months generally, — and it must be an extra good egg that will hold in good condition for ten months. Eggs that are kept under refrigeration must be even more carefully selected than poultry, which is to be kept hard frozen. The results of deterioration in eggs are more plainly detected by the consumer than are deterioration changes in poultry. By careful handling of eggs, just as by careful handling of poultry, the quality to the consumer can be enormously increased, and the length of time during which eggs can be made available as food for the people can also be increased.

Mr. LITTLEFIELD. Assuming that eggs go into cold storage in good condition, do you or not express the same opinion as to the time limit with reference to eggs that you have with reference to poultry?

Dr. PENNINGTON. I see no reason for making any distinction between them, because eggs will regulate themselves.

Mr. LITTLEFIELD. And therefore you see nothing to justify or require a limit of less than twelve months?

Dr. PENNINGTON. The handling conditions will settle that.[1]

In a report of studies of poultry, published by the United States Department of Agriculture, Dr. Pennington makes the following statement concerning eggs: —

The length of time that eggs can be kept in cold storage depends very largely upon their condition when they enter it. As has been stated, eggs laid early in the season during cool weather keep best. Carefully graded, packed and transported, such eggs are good food at the end of nine months. It is likely that they will not soft boil

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[1] Hearings, United States Senate Committee on Manufactures, 1911, p. 71.

> or poach with entire satisfaction at the expiration of that period, but for all other methods of cooking they are available. If the eggs are of strictly first quality when they enter storage, they will soft boil after six or seven months and compare satisfactorily with the "strictly fresh" eggs of the market. Indeed, when the lay falls off in the late summer and autumn, and farmers begin to hold eggs for high prices, good stored eggs from early lots are to be preferred to the average market offerings.[1]

In a letter to this commission, Dr. Pennington again states her views on the question of the proper time limit for eggs: —

> Eggs will not keep much more than nine months even if put into storage in the best of condition. Ordinarily they are out of storage at the end of nine months. Keeping them beyond that time, as you know, means so great a loss that no one would do it if he could possibly help it. It is this natural time limit on egg storage which, in my opinion, would make an exception of them to the general rule that, for the welfare of all concerned, food products in storage should have a time limit placed upon them by law.

The testimony of representatives of the trade is in substantial agreement with the conclusions of the government experts. Mr. Louis F. Swift of Swift & Co., Chicago, states that eggs can be carried eleven months without deterioration in the modern cold-storage warehouse.[2] Mr. Frank E. White of Armour & Co., in answer to a question as to how long an egg in cold storage would remain wholesome and palatable, before the United States Senate Committee on Manufactures said: —

> I never had occasion to eat an egg that had been in cold storage longer than ten months. I have had lots of them that were that long in storage, and they were better, more palatable and more uniform

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[1] Circular No. 64, p. 37.

[2] Report, United States Senate Committee on Manufactures, 1910, p. 266.

than eggs I had bought at the local stores that were said to be strictly fresh, and that cost me twice as much.[1]

Mr. J. M. Thomas testified before this commission that eggs could be kept in a wholesome condition ten or eleven months.

There is one fact in this connection that deserves attention. Eggs differ from the other commodities in that they are not frozen in storage. Eggs are kept at a temperature from 29 to 31 degrees, while meat products, poultry, fish and butter are all held at low freezing temperatures. The fact that eggs are not frozen would indicate that they cannot be kept wholesome so long as can other commodities.

It appears, furthermore, that eggs are very rarely held in storage beyond one year. Mr. George H. Stoddard, treasurer of the Quincy Market Cold Storage and Warehouse Company, stated before this commission that he had never known of a case of an egg being held in storage commercially for a longer time than one year. The practice of the warehousemen appears to show that they recognize the limit of storage to be shorter in the case of eggs than in the case of other products. Mr. R. B. Fitz-Randolph, chief of the division of food and drugs, State Board of Health, of New Jersey, testified before the United States Senate Committee on Manufactures that he had investigated in his laboratory some eggs stored for fourteen months, and had found them to be in a condition which he would call good. He explained, however, that the eggs in question did not represent the ordinary storage egg, as they were of exceptionally good quality, and had been stored on the very day they were laid.[2] The instance cited by Mr. Fitz-Randolph is, therefore, quite exceptional, and does not warrant any conclusion regarding the keeping powers of storage eggs in general.

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[1] Hearings, United States Senate Committee on Manufactures, 1911, p. 301.

[2] Report, United States Senate Committee on Manufactures, 1910, p. 113.

The evidence indicates that the natural storage limit for eggs is somewhat shorter than twelve months.

Butter. — The investigation of the effects of cold storage upon butter, for the United States Department of Agriculture, were conducted by Dr. L. A. Rogers. He stated to a representative of this commission that there is no reason for any shorter limit than twelve months for butter. Before the United States Senate Committee on Manufactures he testified as follows: —

Mr. LITTLEFIELD. Be kind enough to state to the committee whether or not in your judgment, from the standpoint of wholesomeness and fitness for food, assuming the butter is in good condition when it enters cold storage, there is anything from a scientific or from a practical standpoint that will either justify or require a limit on cold storage of less than twelve months?

Dr. ROGERS. No, sir; I have no information that would lead me to believe that.

Senator CUMMINS. But so far as health is concerned, there is no limit to the period during which butter may be kept in cold storage?

Dr. ROGERS. No, sir; I think not.[1]

The testimony of dealers might also be cited as confirming the opinion of this expert. Mr. Charles F. Droste, a leading dealer in butter and eggs in New York city, declares that butter is "entirely safe for one year." He stated before the United States Senate Committee on Manufactures: —

Butter is entirely safe for one year. There is no question of its healthfulness for two years, or its becoming unhealthful after two years or three years. It does not become unhealthful. It becomes less palatable, but its palatability and quality immediately determine its price. Furthermore, no sane man would carry his butter beyond one year if he could possibly avoid it. There has been one or two years in my experience where it was unavoidable to carry butter beyond the season because it could not be sold except at a frightful sacrifice.[1]

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[1] Hearings, United States Senate Committee on Manufactures, 1911, p. 79.

Mr. Louis F. Swift of Swift & Co. declares that butter can be kept for fifteen months without deterioration in a modern cold-storage warehouse.[2] It may be added in further evidence on the subject of butter that this commodity is excepted from the ten months' limit fixed in the New York act, its storage being permitted for 12 months.

It is clear that the time limit on butter should not be shorter than one year.

Meat Products. — No studies with respect to the cold storage of meat products have been published by the United States government. Experts who have investigated this subject for some of the packing establishments declare that meat products can be preserved in a wholesome condition for periods exceeding one year. Dr. W. D. Richardson, chemist and bacteriologist for Swift & Co., testified before the United States Senate Committee on Manufactures that beef properly kept in cold storage at temperatures of 15 degrees above zero, or lower, can be preserved for an unlimited time.

Senator CUMMINS. . . . Were those samples or specimens of food, whether of beef or poultry, just as wholesome at the end of the longest period at which you examined them as they were originally?

Dr. RICHARDSON. They were just as wholesome and just as palatable. We had not reached the limits of the possibility of freezing in storage.

Senator CUMMINS. So, as a scientist, your opinion is that, if properly kept in cold storage, there is no known limit of time?

Dr. RICHARDSON. There is absolutely no known limit.

Senator CUMMINS. At which they become unfit for food?

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[1] Hearings, United States Senate Committee on Manufactures, 1911, p. 184.

[2] Report, United States Senate Committee on Manufactures, 1910, p. 266.

Dr. RICHARDSON. There is absolutely no known limit, Senator.[1]

Mr. URION. You refer to freezer storage?

Dr. RICHARDSON. I refer to freezer storage, at temperatures of 15 or below. All our experiments were carried out at 15 or below.

Senator REED. Of course you cannot apply that to eggs?

Dr. RICHARDSON. No, sir; that is a different case entirely; they are not frozen.[2]

The representatives of the packers claim that they can carry meat products for more than a year without deterioration. The average time of storage, however, is much shorter than one year, not exceeding four or five months. Mr. Frederick R. Burrows, representing G. H. Hammond & Co. of Chicago, declares he has seen meat kept in freezer storage for upwards of two years, and that at the end of that time it was in perfect condition.[3] Mr. A. R. Urion, general counsel for Armour & Co., states that for experimental purposes that company has kept meat for as long a period as two years. The extreme period for which meat is held for market purposes he states to be sometimes as long as fifteen months.[4]

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[1] The following classic instance of "long-distance" refrigeration of meat products is given in "Ice and Refrigeration" for March, 1910: —

"The annual report of the Board of Regents of the Smithsonian Institution, Washington, D. C., has just been issued. Of interest to cold-storage warehousemen is the brief report of the finding of the remarkably well-preserved specimens of prehistoric animals in the frozen regions of Siberia. Of these, it is stated, 'the mammoth is, without exception, the best known of all prehistoric animals, for not only have its bones and teeth been found in immense numbers, but, in several instances, frozen carcasses have been discovered nearly, if not quite, intact, the hair, hide and even the viscera and muscles wonderfully preserved. In many instances they were irrevocably lost or were devoured by the dogs and wolves, or by the natives themselves.' Two specimens, it is added, have been preserved and are now in the St. Petersburg Zoölogical Museum One of these was found 'at Beresovka, Siberia, 800 miles west of Behring's Strait, and 60 miles within the Arctic circle. It is supposed that this creature slipped into a crevasse in the ice which may have been covered by vegetation, as in the Malaspina glacier of Alaska. That the poor brute died a violent death is certain from the fracture of the hip and one foreleg, and the presence of unswallowed grass between the teeth and upon the tongue. A great mass of clotted blood in the chest tells how suddenly the Reaper overtook it, the creature having burst a blood vessel in its frantic efforts to extricate itself. This interesting relic is mounted in the St. Petersburg Museum, the skin in the attitude in which it was found (sitting upon its haunches), while the skeleton is in walking posture beside it.' Of especial interest at the present time is the fact, here corroborated, that the frozen meat of these hairy mammoths, preserved in nature's cold-storage warehouse for many thousands of years, was still fit for food, and was devoured by animals and by men without in any way showing any of the consequences that would have followed had the meat been putrid or unwholesome."

[2] Hearings, United States Senate Committee on Manufactures, 1911, p. 337.

[3] *Ibid.*, pp. 247, 248.

[4] *Ibid.*, p. 234.

There are no facts at present available that would call for a shorter time limit for fresh meat products than for poultry.

Fish. — In the case of fish, as in the case of meat, there is no available testimony by government experts. Dr. H. D. Pease of the Lederle laboratory, New York city, has investigated this subject, and he declares that there is nothing that would justify or require a limit shorter than twelve months. He testified before the United States Senate Committee on Manufactures as follows: —

Mr. LITTLEFIELD. Have you ascertained anything as to the result of your investigation and of the examinations that you have made which, from the standpoint of wholesomeness, assuming that the fish are in good condition when they enter cold storage, would either justify or require a time limit in cold storage of less than twelve months?

Dr. PEASE. No, sir; I have not.[1]

Dr. W. J. Gies of Columbia University confirmed this opinion in his testimony before the same committee: —

Mr. LITTLEFIELD. Have you had any occasion to examine fish that have been the subject of cold storage?

Dr. GIES. I have.

Mr. LITTLEFIELD. Please state to the committee what your experiments along that line have been.

Dr. GIES. Briefly stated, fish in cold storage for a year,— bluefish, for example, and fluke, — when allowed to thaw in my office on an ordinary table at room temperature, after twenty-four hours (that is, after the flesh had softened), or after they had softened, appeared to be practically identical with fresh fish of the same kind.

Mr. LITTLEFIELD. How long had that fish been in cold storage?

Dr. GIES. Practically one year.

The CHAIRMAN. You say it appeared to be?

Dr. GIES. I took the statement of those who gave the materials, for naturally I cannot be absolutely sure, not having seen it go into storage in the first place. I can give you the name of the gentleman who presented it to me.

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[1] Hearings, United States Senate Committee on Manufactures, 1911, p. 89.

Senator Cummins. That was not the question.

The Chairman. You used the word "appeared;" I had reference to that.

Dr. Gies. I thought you referred to the period of storage. I was stating my impression of the general appearance of the fish, and was about to go on with details in that connection. I said the thawed fish appeared to be as good as ordinary fresh fish. On pushing a finger into the fish and examining the flesh more directly, I got the impression that the flesh was a little softer than that of fresh fish. After cutting into the fish and examining the flesh more directly, I thought the flesh itself was softer than that of fresh fish. In microscopic examinations of the flesh the difference was found to be extremely slight as compared with fresh fish. In fact, the flesh of the thawed fish was in better condition than that of a fresh bluefish which had been kept in an ordinary house refrigerator for three days. Extracts were made of the thawed fish for the purpose of separating poisons, assuming that such substances might be there. The results were absolutely negative; that is, no poisonous material could be gotten from the fish which had been in cold storage for a year, assuming that the poisonous substances were there and using methods to catch any that might have been contained.[1]

The testimony of cold-storage dealers might also be cited. Mr. Jonathan F. Snow, director of the Provincetown Cold Storage Company, stated before this commission that no change takes place in fish, fresh caught and stored immediately, during a year's storage. Mr. E. F. Case, wholesale fish dealer of Cleveland, told the United States Senate Committee on Manufactures that two years was the extreme period during which a fish could be kept in cold storage and remain palatable.[2] Mr. C. M. Prankard, representing the New York Wholesale Fish Dealers' Association, declared that a fish could be kept cold stored in a perfectly wholesome condition for at least one year. Mr. Kenneth Fowler, fish dealer of New York, stated that up to eighteen months fish could be kept in storage as wholesome as when it went in.[1]

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[1] Hearings, United States Senate Committee on Manufactures, 1911, p. 84.

[2] *Ibid.*, p. 14.

The practice in storing fish, it should be observed, is to dip them in water from time to time, thus covering them with a glazed coating of ice. This makes a hermetically sealed package of the fish. This method makes it possible to preserve fish for long periods. Mr. Frank H. Field, representing the New York Wholesale Fish Dealers' Association, emphasizes this fact as follows: —

> If you get a fish in that hermetically sealed package, and keep the air conditions and the temperature right, you can keep that fish indefinitely, and there is no more reason why it should be destroyed at the end of a year than there is why you should go out in the city of Washington and destroy valuable goods of any kind.[2]

There appears to be nothing that would justify a shorter time limit than one year in the case of fish.

Conclusions and Recommendations with Respect to Time Limit.

The conclusions that have been reached in this examination of evidence may be summed up as follows: there is no existing evidence which would warrant a shorter time limit than twelve months in the case of meat products, poultry, butter and fish; in the case of eggs there is certain evidence that points to the advisability of a limit of nine or ten months.

It is true that a shorter limit than twelve months is fixed in legislation enacted by other States. The limit is ten months in New Jersey and New York, — butter being allowed a twelve-months' limit in the latter State, — nine months in Indiana and six months in Delaware. But investigation fails to disclose any facts that would justify these lower limits. They would appear to have been fixed arbitrarily, without careful consideration of the results of scientific experimentation as to the proper limits of storage in the case of different commodities. It is believed that this commission has made a much more thorough study of this subject than any of the legislative committees which have passed upon the bills proposed in other States. The investigation has not brought to light any valid reasons for imposing a shorter limit than twelve months for commodities in general.

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[1] Hearings, United States Senate Committee on Manufactures, 1911, p. 164.

[2] Report, United States Senate Committee on Manufactures, 1910, p. 224.

No demand for the imposition of a time limit of less than one year has been made at any hearing before this commission. Limits of ninety days and six months were proposed in bills introduced at the last session of the Legislature. The petitioners for this legislation were notified by letter of the dates of hearings to be held by the commission, and were requested to appear and present their views. No one, however, appeared in favor of legislation fixing a time limit. In fact, only one person came before the commission at the hearings in advocacy of further regulation of cold storage. This witness, Junius T. Auerbach, Esq., urged the advisability of inspection and of requirement of marking or tagging, but did not ask for a time limit. He was doubtful in his own mind with respect to the advisability of a time limit. In his introductory statement he even declared that he was not in favor of fixing a time limit. Later, in his testimony, in reply to a question by the chairman as to whether he believed a time limit to be desirable, he replied: "Well, I think I believe in that, but I am not expert enough to say whether I believe in it or not. I should say a season time limit on butter and fruit was all right, but I shouldn't think a hard and fast limit on a thing like an apple would be required."

After weighing carefully all the facts of the situation, the commission has decided to recommend: —

1. That a maximum limit of twelve months be fixed for the retention of food products in cold storage.

2. That the State Board of Health be given the power to extend this limit in the case of particular consignments of goods.

3. That the State Board of Health be further empowered to fix a shorter limit than twelve months for specified commodities, if investigation should show such additional restriction to be advisable.

The commission recognizes that exceptional market conditions might arise which would warrant an extension of the limit beyond one year, in order to prevent undeserved financial losses to individuals. There seems to be no sound reason why such extension should not be permitted at the discretion of the State Board of Health, if the goods in question are found to be in proper condition for further storage. The commission, therefore, recommends that authority to permit storage for a longer period than twelve months be conferred on the State Board of Health. This power should be exercised, however, only under proper safeguards. Permission to extend the period of storage should be granted only upon application stating the reasons why the extension is desired; the additional time for which storage may be continued should be fixed in the order giving the desired permission; the circumstances of each case in which an extension permit is issued should be set forth in detail by the State Board of Health in its next annual report.

The commission also recognizes that, while the facts with respect to the effects of cold storage upon different food products as thus far determined by scientific investigation and practical experience do not call for a shorter limit than twelve months for commodities in general, further research may possibly show the need of fixing a shorter limit in the case of certain commodities. The valuable investigations in this field, conducted by the experts of the Bureau of Chemistry of the United States Department of Agriculture, are still in progress. It is possible that facts may be brought to light by these and other researches which would demonstrate the advisability of shortening the twelve months' limit for some class or classes of goods. In the case of eggs, the evidence already available indicates, as has been set forth, that the normal storage period is shorter than twelve months. But in view of the fact that the practice of the trade appears to conform to this limitation, the commission does not regard it as immediately urgent to make an exception to the twelve months' rule in this case. The most satisfactory disposal of the whole question as to specific time limits for different commodities shorter than the general year limit, in the opinion of this commission, is to leave the matter in the hands of the State Board of Health. The commission accordingly recommends that this Board, in connection with its activities in the enforcement of the provisions of the proposed law, give a careful consideration to the subject of time limits, and that the Board be given power to prescribe a shorter limit than twelve months in the case of any food product for which investigation may show further limitation of the period of storage to be desirable.

In short, the solution of this question of a time limit proposed by the commission is that a maximum limit of twelve months for all commodities be fixed in the act, and that the Board of Health be empowered to extend this limit in individual cases, and to prescribe a shorter limit for particular commodities, if the Board, upon investigation, finds further extension or reduction of the time limit to be reasonable and expedient.

The provisions of the act embodying these recommendations are as follows: —

SECTION 5. No article of food shall be held in cold storage within this commonwealth for a longer period than twelve calendar months, except with the consent of the state board of health as hereinafter provided.

The state board of health may, upon application, grant permission to extend the period of storage beyond twelve months for a particular consignment of goods, if the goods in question are found, upon examination, to be in proper condition for further storage at the end of twelve months. The length of time for which further storage is allowed shall be specified in the order granting the permission. A report on each case in which such extension of storage may be permitted, including information relating to the reasons for the action of the board, the kind and the amount of goods for which the storage period was extended, and the length of time for which the continuance was granted, shall be included in the annual report of the board.

The state board of health is hereby further empowered, after such investigation as it considers necessary, to determine whether or not a shorter time limit than twelve months may be desirable in the case of any article of food, and to name a specified number of months less than twelve which shall thereafter be the time limit of storage for such article of food. Such action by the board shall be taken only after a public hearing on each proposal of a shorter time limit than twelve months. Any time limit shorter than twelve months which may be fixed by the board of health, in the exercise of the power herein conferred, shall go into effect thirty days after written notice has been sent to all persons, firms or corporations licensed to operate cold-storage or refrigerating warehouses, informing them of the decision of the board.

4. REGULATION OF SALE OF COLD-STORAGE PRODUCTS.

The adoption of regulations for the retail distribution of cold-storage commodities is proposed as a supplementary measure in connection with the requirement of marking or tagging goods placed in cold storage. The latter provision will not carry the information regarding the fact of cold-storage to the ultimate consumer. It is reasoned that the consumer has a right to know whether he is buying cold-storage products or fresh goods, and also the length of time during which the former have been kept in storage. At present deception in the sale of cold-storage goods is widely practiced. Dealers who buy cold-storage eggs at 20 to 25 cents a dozen palm them off with impunity on unsuspecting customers at 40 to 50 cents a dozen. The regulation of retailers is called for as a means of protecting the public against imposition. This demand seems entirely reasonable. Eventually it may be found to be desirable to regulate also the manner in which cold-storage meats, poultry, fish and other products are handled in the retail market. The most important need of regulation at the present time, however, relates to the protection of the public against deception through the sale of cold-storage goods as fresh.

Deception of Consumers.

The deception now practiced on customers is thus described in a report on the " Effect of the Present Method of handling Eggs on the Industry and the Product," in the Yearbook of the United States Department of Agriculture, 1910: —

> In January, 1910, the wholesale price of fresh eggs — that is, current receipts — in New York ran from 32 to 42 cents a dozen. Prime western storage eggs, meanwhile, were selling at 26 to 28 cents. More than half of all the eggs consumed in New York were cold stored, yet the retailers assured you that their supplies were "fresh, perfectly fresh, except — well, yes, those small stained eggs in that small basket are storage eggs, and, of course, they are lower in price."
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> Now, what is the truth of this matter? In all likelihood every egg there was cold stored. The very large, clean, best-order eggs were

sorted out and priced as "strictly fresh;" the next most desirable as "fresh," and so on. In order to sell those for what they are not, a mistaken impression of all stored eggs was given by calling the worst eggs in the shop cold stored. Every man who handled those eggs knew they were cold stored, and paid a price in accordance with that fact, except the consumer. The consumer, partly because of ignorance concerning the season of egg production, partly because of prejudice against all cold stored eggs for all purposes, has allowed the retailer to trade upon his ignorance and prejudice to the great betterment of the retailer's pocketbook. In an age when information is so readily available the consumer is to blame for not knowing more about the subject. Knowing that from November until February egg production has almost ceased, except in the south, and that the market reports 26 to 28 a dozen for good-storage eggs, does it not follow that the sensible customer will demand, and get, eggs for about 30 cents a dozen that will fry, scramble, or beat into an omelette in a perfectly satisfactory manner? For soft-boiling or poaching eggs the consumer in the large city must expect to pay from 20 to 40 cents a dozen above the store-egg price, and even at that figure, because the supply will not go around, he is apt to get eggs that have been held by the farmer until they are really lower in quality than the cold-stored article.[1]

In a letter submitted to the Senate Committee on Manufactures in April, 1910, Dr. Pennington comments as follows on the matter of deception: —

Cold-storage foods are sold as "cold-stored" through every branch of the industry. The retailer, when the ultimate consumer is to be served, is apt to call all high-class goods "strictly fresh," regardless of past history; ordinary goods are "fresh," and the low-grade stuff is apt to be apologized for as "cold-storage," though in a large percentage of cases it has never been in a cold-storage warehouse.

Such statements by the retailer have created an unfounded prejudice in the mind of the public, — bad for the public, but good for the retailer's pocketbook. The public knows so little about seasonal production that it is easily fooled. For example, the housewife insistently demands fresh broiling chickens when there are none in the market. Therefore the dealer is very apt to give her very good storage stock and assure her that it is fresh. If the stock is good he is ordinarily perfectly satisfied that he has told the truth.

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[1] "The Effect of the Present Method of handling Eggs on the Industry and the Product," M. E. Pennington and H. C. Pierce, Yearbook, Department of Agriculture, 1910, pp. 473, 474.

Eggs follow the same rule. There are times during the year when only the small inner circle can be supplied with fresh eggs. The great majority of people who live on moderate or even more than moderate incomes will be given high-grade storage eggs, because they are really the best that the market affords. But the popular prejudice against cold storage, and ignorance in regard to seasonal food supply, is so great that the retailer falls back upon falsehood in order to supply his trade with the goods they really want.[1]

Existing Provisions of State Laws.

Various measures for the regulation of the retail sale of cold-storage products are prescribed in the existing State laws. The New Jersey law contains no provision on this subject. The New York law provides that it shall be a violation of the provisions of the act to sell any article of food that has been kept in cold storage without representing it as such. The Delaware act makes it unlawful to dispose of any eggs that have been kept in cold storage except from the original crate or package, marked with the date when the eggs were placed in storage. The California legislation declares it to be a misdemeanor to represent cold-storage eggs or butter as fresh goods, and also requires that any one offering for sale eggs or butter that have been in storage for a longer period than three months shall cause the period of time during which the goods have been so held to be stamped, marked or branded on all sides of each receptacle holding the goods, in black-faced letters two inches in length; and, further, that every concern offering cold-storage eggs or butter for sale shall display in a conspicuous place in the salesrooms a sign bearing the words "cold-storage eggs or butter sold here," in black-faced letters not less than six inches in length upon a white ground. The Indiana law goes still further. It provides that packages must show the dates of entry into storage and withdrawal; that cold-storage eggs shall not be represented as fresh goods; that the receptacles containing storage eggs shall be labeled or placarded; and that the bag or container in which they are sold to the consumer shall also be marked with the words "cold storage." The section of the law containing these provisions reads as follows: —

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[1] Report, United States Senate Committee on Manufactures, 1910, p. 168.

> SECTION 5. That it shall be unlawful for any person, firm or corporation to sell or have in its possession with the intent of selling, or offering or exposing for sale any package, box, cask, barrel, tub or other receptacle in which any meats, fish, eggs, butter, cheese, poultry, game, fruits, farm or garden produce, or any other perishable foodstuffs are packed or contained and which has been taken or removed from any cold storage or refrigerating warehouse, where the stamp showing the date such articles of food were placed in any such cold storage or refrigerating warehouse has been removed, defaced, altered or destroyed, or is not plainly legible, nor shall such person, firm or corporation sell, either at wholesale or retail, any storage eggs as fresh eggs, and all invoices shall plainly state whether such eggs are storage or fresh and when such eggs are sold at retail, in case eggs so sold have been in storage thirty days, there shall be placed in or on the receptacle containing them, in full view of the public, a card not smaller than six inches in width by six inches in length, upon which shall be printed the words "cold storage," in plain gothic letters not less than two inches in length, and the wrapper, bag or container in which said eggs are delivered to the purchaser by the retailer shall be plainly stamped with the words "cold storage."

The Heyburn bill for the regulation of cold storage, as proposed by the chairman of the United States Committee on Manufactures in the spring of 1911, provides that when any article of food which has been held in cold storage, or the package containing it or from which it is sold, fails to bear a label stating the date of production, killing, packing or manufacture, and the period of time during which the article has been held in cold storage, it shall be deemed to be misbranded. The act further provides: —

> When any package containing such food products as above designated shall be broken and the contents thereof sold by items, then the seller shall at the request of the purchaser correctly state the information above required to be placed upon the original package, upon a tag to be attached to such item, before delivering the same to the purchaser. The container from which such article is sold shall be in plain view of the purchaser, or on demand produced for inspection by the purchaser.

Two bills introduced in the last Legislature in this State, namely House, No. 262, and House, No. 1328, contained brief provisions relating to the retail sale of cold-storage goods. The first bill provided that the tag showing the dates of receipt into storage and removal from storage, as affixed to the article or the container under the provisions of the bill, should be displayed by the retailer to prospective purchasers. The second prohibited the sale of cold-storage food unless there should be "plainly and conspicuously displayed on or near the same a statement that it was taken from cold storage. and a statement of the length of time during which it was kept in cold storage."

Difficulties and Objections.

It is obvious that practical difficulties are involved in the enforcement of provisions regulating the retail sale of cold-storage products. A requirement to sell from the original package, as in the Delaware act, would be burdensome, if not impracticable. A provision requiring the marking or tagging of each article of food that has been held in cold storage, or the receptacle from which it is sold, while theoretically desirable, would be practically objectionable to the retail trade, and would require an army of inspectors for its proper enforcement. The commission does not believe that it is expedient to enact such a requirement at the present time. It would seem, however, that a provision requiring dealers to represent cold-storage products as such would be a reasonable measure for the protection of consumers against fraud. The effective enforcement of a provision of this kind would obviously be difficult, but its presence on the statute books would in itself act as a deterrent to the practice of deception, and might be expected to prove of some benefit to consumers.

Objections are raised to the regulation of retailers in the proposed manner on the ground that it would interfere with their business, and would injure the sale of cold-storage goods on account of the popular prejudice against them. A witness before this commission at one of its hearings, representing the fish-freezing industry, stated that cold-storage salmon is sold in hotels and elsewhere as fresh salmon, and contended that "to label it as cold-storage salmon would be a bad thing for the public, with their unfounded prejudices; it would set imaginations to work which would in no way benefit any one." The immediate effect of such provisions would doubtless be to reduce to a greater or less extent the sales of cold-storage products, but, if the enactment of such provisions were followed up by a campaign of education on the part of the trade, the result in the end would be beneficial to all concerned. Cold-storage goods ought to be sold openly on their merits, and not foisted upon purchasers under false pretences. No branch of trade can flourish in the long run on a policy of deceit.

The regulation suggested is in line with the requirements of the national pure food law as to labeling and branding.

The laws of this State relating to the sale of oleomargarine, renovated butter, milk, cheese and other products contain provisions for the regulation of retailers designed to protect consumers against imposition. Among other requirements the law provides for the display of signs in places where oleomargarine and butterine are sold.

The present methods of selling cold-storage goods are designed to keep consumers in ignorance of the fact that the goods have been held in cold storage. It would be wiser to enlighten consumers concerning the facts and supplement this knowledge with systematical educational work, in order to create an intelligent demand for cold-storage foods as such. The American Society of Refrigerating Engineers, in a statement submitted to the United States Senate Committee on Manufactures, declared that "a law which required all retailers to state truthfully which goods came from cold storage would be a good thing. People would soon find that nearly all the best food came from cold storage." The sale of canned goods has been placed upon an open basis and greatly promoted by educational advertising. The same policy would be equally profitable for the cold-storage business. The sooner the dealers are forced to abandon fraudulent practices the better it will be for the trade itself.

Recommendation with respect to Retail Regulation.

The enforcement of retail regulations should be under the direction of the State Board of Health, acting in co-operation with local health authorities. The latter are given extensive powers under the present laws with reference to the inspection of food products offered for sale at retail, and the condemnation and destruction of goods found to be unfit for food. The law empowers boards of health of cities and towns to inspect carcasses of all slaughtered animals and all fish, meat, vegetables, produce, fruit or provisions of any kind, and to enter any building in which such foodstuffs are kept for the purposes of inspection. The boards have further power to destroy any such articles which they find tainted, diseased or otherwise unfit for food. It is made punishable by fine or imprisonment, or both, to sell any unwholesome food. These powers, already conferred by existing legislation upon local health authorities, appear to be adequate for the general protection of the public against the sale of cold-storage products unfit for consumption. The additional legislation needed relates to the protection of the public against deception in the sale of apparently wholesome cold-storage products as fresh goods. The extent to which regulation should be carried in its details with respect to the use of tags, labels, signs and the like may well be left to the State Board of Health to determine, under the authority conferred by the law, to make rules and by-laws for the enforcement of its provisions.

The commission accordingly recommends the establishment of a system of regulation of the retail sale of cold-storage products, in order to supplement the provision with respect to marking or tagging, convey to the consumer information regarding the commercial history of the goods, to which he is reasonably entitled, and prevent the fraudulent sale of cold-storage products as fresh. The clause of the bill proposed by the commission which embodies this recommendation is as follows: —

SECTION 6. It shall be unlawful to sell, offer or expose for sale articles of food which have been held in cold storage without notifying persons purchasing, or intending to purchase, the same that they have been so kept.

5. MISCELLANEOUS SUBJECTS OF LEGISLATION.

Prohibition of Restorage.

The practice of returning to cold storage goods that have been removed, thawed and offered for sale is generally admitted to be objectionable. The importance of storing goods in proper condition has been emphasized repeatedly in this report. It is clear that the presumption is strongly against the fitness for cold storage of goods that have once been taken out of the warehouse and exposed for sale. Dr. Pennington has expressed disapproval of this practice in the case of poultry. She declares: —

> The practice of thawing poultry for selling and then, in event of a lagging market, returning the thawed stock to the freezer for a second wait there, is one of the unfortunate habits of the trade, but, happily, it is decreasing among the more careful. Refreezing is never a success, and the loss in quality after the second thawing has led to a strong disapproval of the practice by all who are acquainted with the results. While the refreezing of poultry thawed in the air is decidedly deleterious, that which is thawed in water and refrozen is in a much worse condition.[1]

Much additional testimony regarding the objectionable character of this practice might be cited, but the point seems so obvious as to require no extended discussion.[2]

The suggestion was offered by Dr. Alexander Burr, inspector of the Boston board of health, in his testimony before this commission, that goods returned to cold storage after once being withdrawn and placed on sale should be subject to inspection by the health authorities. The commission is of the opinion that it is desirable to go even further, and to prohibit absolutely the restorage of such goods. Such a prohibition is a feature of both the New York and New Jersey acts. It is important, however, that the prohibition should be drawn in such terms as not to interfere with the proper handling of goods in the trade, including their transportation by refrigeration methods and transfer from one cold-storage warehouse to another. A general prohibition of restorage would prevent goods that had been placed in temporary cold storage during accumulation, or in the process of pre-cooling, and goods transported in refrigerator cars from being stored subsequently in cold-storage warehouses adjacent to the consumer. It would also prevent the transfer of goods from one warehouse to another in a different city under proper conditions. Obviously, any prohibition of restorage should be so restricted as to reach the evil at which it is aimed, which consists in the return to storage of goods that have been withdrawn, thawed and offered for sale at retail, and not to interfere with the legitimate processes of transporting and handling goods under refrigeration. The clause of the bill designed to accomplish this purpose, as proposed by the commission, reads as follows: —

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[1] "Studies of Poultry from the Farm to the Consumer," M. E. Pennington, Circular No. 64, Bureau of Chemistry, United States Department of Agriculture.

[2] Report, United States Senate Committee on Manufactures, 1910, pp. 110, 163, 238, 266; Hearings, United States Senate Committee on Manufactures, 1911, pp. 185, 186, 213, 231, 233, 375, 381, 385, 417.

> SECTION 7. It shall be unlawful to return to cold storage any article of food that has once been released from such storage for the purpose of placing it on the market for sale to consumers, but nothing in this section shall be construed to prevent the transfer of goods from one cold-storage or refrigerating warehouse to another, provided that such transfer is not made for the purpose of evading any provision of this act.

Sale of Cold-storage Products in Frozen Condition.

The desirability of requiring cold-storage products to be kept and sold to consumers in a frozen condition has been urged upon the consideration of the commission. While such a requirement might be theoretically desirable, especially in the case of meat and poultry, it would be very troublesome, if not impracticable, under existing conditions. The ideal method of distributing cold-storage products would doubtless be to keep them in a frozen state until they reached the ultimate consumer. Such a requirement, however, is not in accord with the present customs with respect to the handling of cold-storage products in retail shops and in the homes. Its observance would demand a revolution in these methods. There is no provision on this subject in any existing State law relating to cold storage. The Heyburn bill contains such a provision, prohibiting the sale of articles of food that have been frozen in cold storage except in a frozen condition. The commission is of the opinion that, while it may be desirable ultimately to bring about such changes in the present methods of handling cold-storage products in the retail trade as will get them to the consumer in a frozen condition, it is not expedient at this time to enact a requirement of this kind. The matter is one that might well be taken under consideration by the State Board of Health, in its administration of the proposed law, with a view to offering a recommendation of some provision on this subject, if such action should later seem to be expedient. The commission accordingly has not put into the bill any provision relating to the sale of cold-storage goods in a frozen condition.

Storage of Broken Eggs.

The practice of breaking eggs into cans and storing them in a frozen condition has increased greatly in recent years. These broken or canned eggs are used largely by bakers. They are also used for other than food purposes by tanners, photographers and jewelers. It is asserted that inferior eggs are worked off in this manner, spoiled eggs when broken into cans being treated with a chemical to conceal their condition. The percentage of ammonia in these broken or canned eggs is often found to be extremely high. The State food and drug inspector, who has been engaged in the work of examining eggs in cold storage, complains of difficulty in enforcing in this case the provisions of law relating to the sale of unwholesome food. The law empowers inspectors to confiscate and destroy food that may be found to be unfit for consumption. If a can of frozen eggs is found to be below the standard of wholesomeness, the owner may assert that the eggs are intended not for human consumption but for commercial use, and thus avoid the penalty. The secretary of the State Board of Health recommended to this commission that a provision be inserted in the law requiring frozen eggs not designed for food purposes to be labeled as such. This would prevent evasion of the law, and would assist the State inspectors in their work of enforcement. The commission, therefore, recommends the following provision: —

SECTION 8. Broken eggs packed in cans, if not intended for use as food, when deposited in cold storage shall be marked by the owners in accordance with forms prescribed by the state board of health, under the authority hereinafter conferred, in such a way as plainly to indicate the fact that they are not to be sold for food.

Cold-storage Products from Other States.

Two of the State laws relating to cold storage contain provisions designed to regulate the receipt into cold storage or the sale of goods that have been held in cold storage outside the State. The Indiana act prohibits the sale within that State of any food product which has been held in cold storage outside the State, unless it shall have been marked, stamped or tagged in accordance with the provisions of the act. The New Jersey act prohibits the receipt into cold storage of any article of food which has been so held without the State, unless at the time of such receipt the article in question is marked with the date when it was first placed in cold storage, or unless the consent of the State Board of Health for the receipt of such articles shall have been obtained. In enforcing its provision the New Jersey Board of Health has adopted the practice of first issuing a tentative permit in the case of goods coming from outside the State; then, upon later examination, if the goods are found to be in proper condition for further storage, the permit is made permanent.

It is the opinion of this commission that no provision relating to the receipt or the sale of goods that have been held in cold storage outside the Commonwealth need be incorporated in the law at the present time. The provision for the inspection of all goods upon entry into storage, embodied in the law, would seem to cover this matter adequately. In any event, the question of regulating interstate traffic in cold-storage commodities is one that can be dealt with effectively only through national legislation. If a special provision on this subject were later found to be desirable or necessary in the cold-storage regulations of this Commonwealth, the act could be amended upon recommendation of the State Board of Health. The commission, therefore, makes no recommendation with respect to the regulation of the receipt or the sale of cold-storage products coming from outside the State.

6. PROPER SCOPE OF COLD-STORAGE REGULATION.

An important question in drafting a bill for the regulation of cold storage is the scope of the measure. Should it apply to all food products carried in cold storage, or should it be restricted to certain classes of such goods?

The method of dealing with this matter in laws thus far enacted is to make the application of the statute general, and then to enumerate certain exceptions. The New York act applies to any article used for food by man or animal, except nuts, fruits, cheese and vegetables. The New Jersey act applies to any article used for food, except liquid food. The Delaware act applies to any article used for food or drink by man or animal, except fruits and fish. The Indiana act applies to all food products, without exception. The method of making exceptions seems to be unsatisfactory. The list of food products carried in large warehouses is a very long one. In the case of many of these goods there is no valid reason for imposing restrictions with respect to the duration of the storage period, or other conditions. For example, there is obviously no need of regulating the storage of the following classes of food products, all of which are carried in Boston warehouses: citron, currants, raisins, dates, figs, prunes, exaporated apples, evaporated peaches, beans, peas, horse-radish, flour, cereals, rice, macaroni, peanuts, condensed milk, canned goods, syrups, fruit juices, jellies, preserves, olive oil, pickles, anchovies, caviar, lard, smoked meats, pickled meats, candied fruits, dried fish.

Manifestly the scope of any legislative measure should be confined in any event to perishable food products. Within this class of foodstuffs, moreover, there are numerous varieties that need no restriction with respect to cold-storage handling. This commission, therefore, instead of following the usual course of making the application of the proposed regulations general, and then indicating exceptions, has deemed it more logical and practical to take the other course of specifying in the law the particular food products to which its provisions shall apply, leaving the cold storage of unenumerated goods entirely unrestricted. After careful consideration of this matter, the commission has decided that the following food products should be enumerated as subject to the proposed regulations: —

Fresh meat and fresh meat products.
Fresh food fish.
Poultry.
Eggs.
Butter.

The commission recommends further that the State Board of Health be empowered to add other commodities to the enumerated list, if in the judgment of the Board such extension of the provisions of the law would be advisable. It is possible that further investigation or experience in the cold-storage business might show it to be desirable to include additional food products under the provisions of the law. These conclusions are embodied in the following provision of the proposed bill for the regulation of cold storage: —

> The term "article of food," as used in this act, shall be interpreted to include fresh meat and fresh meat products, fresh food fish, poultry, eggs, butter, and any other food products that may be specified from time to time by the State Board of Health, under the authority hereby conferred.

It may be well to indicate the reasons for not including under the provisions of the proposed act certain food products which are stored largely in refrigerating plants.

Fruits were not included because deterioration is here so obvious as to be detected readily by the consumer. Consequently there seems to be no need for taking measures to protect the latter, in the case of these goods.

Nuts were not included because deterioration progresses very slowly and involves no serious danger to the health of consumers.

Cheese was not included for the reason that no menace to health is threatened by prolonged storage. Indeed, up to a certain point some varieties of cheese improve with age.

The attention of the commission was directed to the fact that there is an established demand for certain classes of cheese carried in cold storage for long periods. Any time limit for the storage of cheese would interfere with a legitimate branch of the trade. Mr. A. J. Bartlett, wholesale dealer in cheese, gave interesting testimony on this matter. He stated that dealers in cheese needed to keep it in cold storage beyond a year's limit "to supply a certain trade that demanded that class of goods," and added that this particular trade was that of the "best hotels, the best families, the best clubs." The class of cheese in question, he explained, is sealed up after it becomes a year old and put in air-tight tins, and is then carried anywhere from one to five years. The dealers extend the time of storage in order to have the old cheese on hand all the time. Mr. Bartlett added that physicians frequently prescribed this old cheese for dyspeptics.

Game was not included for the reason that the storage of game is already restricted by the game laws. The latter prohibit the buying or selling, as well as the taking or killing, of birds and animals subject to the game law restrictions during the closed season. This prohibition seems adequate to regulate the storage of game.

7. OPINIONS OF STATE HEALTH OFFICIALS ON THE SUBJECT OF COLD-STORAGE REGULATION.

The commission addressed a circular of inquiry to secretaries of Boards of Health in the different States, asking for information in respect to any investigations of the subject of cold storage that had been made under their direction, and also for opinions or suggestions with respect to the need of regulation, and the form which it should take, if needed. It appears that no investigation of this subject has been made by any State Board of Health outside of Massachusetts. The Massachusetts Board of Health published in 1907 the results of two investigations into the storage of drawn and undrawn poultry.[1] With this slight exception the only official health reports on the subject of cold storage now available are those issued by the United States Department of Agriculture, detailing the results of experiments conducted under the Bureau of Chemistry.

The circular of inquiry addressed to the State Boards of Health asked for replies to the following questions: —

1. Is there need of legislation for the regulation of cold storage of food and food products?
2. If so, should such legislation be enacted by the State or by the national government?
3. If State legislation is desirable, should it provide for the inspection of cold-storage warehouses by the State Board of Health?
4. Should the time during which food products may be held in cold storage be limited by State law?
5. If so, what in your opinion should be the maximum limit?
6. Should warehousemen be required by State law to mark or brand food products placed in cold storage, so as to show the length of time during which they are held?
7. Should any restrictions be placed upon retail dealers by State law, with respect to the sale of cold-storage products?
8. If so, what should be the nature of such restrictions?
9. Have you further suggestions to offer with respect to legislation?

Replies were received from 21 Boards. The answers to the questions may be tabulated as follows: —

1. Need of legislation. Yes, 21; no, none.
2. Should legislation be State or national? State, 4; national, 2; both State and national, 15.

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[1] "Report of Chemical Examination of Drawn and Undrawn Poultry kept in Cold Storage," and "Report of Bacteriological Examination of Drawn and Undrawn Poultry kept in Cold Storage," Thirty-ninth Annual Report of the State Board of Health of Massachusetts, 1907.

3. Inspection by State Boards of Health. Yes, 18; no, 3.

4. Time limit. Yes, 19; no, none; no answer, 2. Two of those who recommended a time limit believed that it should be fixed by national, not State, legislation.

5. Maximum limit. Eleven of the replies contained no suggestion or opinion on this question. The 10 replies making a recommendation as to length of the time limit were all different, as follows: Ten days; ninety days; three months; should be longer than three months; three to nine months; nine months; twelve months; eggs, six months, butter, three months, meat, one year; different for different products; fresh meats and poultry, one month, eggs, four months.

6. Marking. Yes, 18; no, none; no answer, 3. One of those who advocated marking believed the requirements should be enforced by national rather than State legislation.

7. Regulation of retailers. Yes, 18; no, none; no answer, 3.

8. Nature of such regulation. Seven replies offered no suggestion. The other 11 replies were divided as follows: —

Give dates by stamps stating time in cold storage.

Prohibit from selling food kept beyond time limit.

Penalty for offering for sale food not dated.

Purchaser should know just what he is getting (2 replies).

Unlawful to sell products after certain time in cold storage.

Labels should be shown.

All such products should be marked "cold storage."

Strict inspections should be made and the sale of all questionable material prohibited.

The situation would be best met in retail stores by a placard of sufficient size indicating that cold-storage products are sold in said store. With such information before him the consumer would then, if he saw fit, make further inquiries as to the character of the food purchased.

Retailers should be required to label their products in a similar manner to that which is prescribed for the wholesaler or warehouseman. Retailers should have certain restrictions placed upon them, — such that the retailer would be required to handle properly cold-storage products previous to the sale thereof, — and these restrictions should be thoroughly and vigorously enforced.

V.

1. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS.

In general, the commission recognizes that cold storage is a fundamental necessity in the distribution of the food supply of the nation. In the first place, it enables perishable food products to be brought to market with the least possible deterioration; in the second place, it enables the surplus of such products in the season of natural plenty to be carried over to meet the demand in the season of natural scarcity. The latter is the principal economic function of cold storage. It acts as a means of distributing the seasonal output of perishable foodstuffs evenly over the market year, thus helping to equalize supply and demand.

Influence on Health.

With respect to the influence of cold storage on health, the commission finds that in the main it is beneficial. While abuses have arisen, through the holding of food products in cold storage for unduly long periods and through the handling of goods by improper methods before and after, as well as during, refrigeration, the benefits that have come from the salvage of food through cold storage far outweigh any evils that have developed in this field. Cold storage has brought about an expansion and diversification of the food supply of the population, making certain kinds of food more abundant and more accessible. It thus makes for the conservation of the vital resources of the people. The gain from this source is universal and permanent; the injuries are occasional and temporary, and can be eliminated by proper regulation.

The commission has made a study of the available scientific data relating to the effects of cold storage on different food products, the results of which are presented in detail elsewhere in this report.[1] The general conclusions arrived at are summed up thus: —

1. A progressive deterioration takes place in perishable food products kept in cold storage; the changes naturally occurring are greatly retarded by refrigeration, but are not absolutely suspended. Therefore, a food product that has been held in cold storage is never just as good as the perfectly fresh article, other conditions being equal.

2. The deterioration taking place during cold storage first appears in a change in flavor, which may affect the palatability of the food, but does not necessarily affect its wholesomeness or nutritive value.

3. The length of time during which an article of food held in cold storage can be kept wholesome and fit for consumption varies for different commodities.

4. The period of proper preservation for any particular commodity depends largely on the methods of handling and preparing for cold storage.

5. Scientific investigation in this field has not yet been carried far enough to enable one to fix normal time limits of cold storage for different commodities.

6. On the whole, prolongation of cold storage beyond one year, even under correct conditions, appears to be undesirable, and prejudicial to the public health.

Effect on Prices.

With respect to the influence of cold storage on prices, the commission finds that the effect is to make prices lower and steadier. It is clear that any factor that helps, as does cold storage, to extend the market for certain commodities, by enabling producers and dealers to dispose of their stocks throughout the entire year, instead of being confined to a limited period, must have the effect of encouraging a larger volume of production. And it is an elementary commonplace of political economy that an increase of supply, other things being equal, leads to reduction of price. It is equally clear that any agency that operates, as does cold storage, to take goods out of the market in the season of abundance, when prices are low, and to hold them for sale in the season of scarcity, when prices are high, tends, other things being equal, to bring about a greater uniformity of prices, preventing them from alternately falling so low and rising so high as would otherwise be the case.

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[1] See pp. 31–65.

The subject of the influence of cold storage on prices is discussed at length in one section of this report.[1] The findings of the commission on this subject, based on a comparative study of the price movements of eggs, butter and poultry, before and after the introduction of cold storage, are summarized as follows: —

1. The per capita receipts of the chief food products subject to cold-storage handling, — eggs, butter and poultry, — increased greatly in the Boston and New York markets during the decade 1901–10, as compared with the decade 1881–90, prior to the general adoption of cold-storage methods. This fact appears to indicate that cold storage has contributed to increase the volume of production.

2. The average prices of butter and poultry were lower in the second decade than in the first; the average price of eggs was slightly higher, but this fact is explained by peculiar conditions affecting the egg market. The lower average of prices in the case of butter and poultry would seem to be a result of the increased volume of production, attributable in part to the influence of cold storage.

3. The average price of butter for the season of scarcity was considerably lower in the second decade than in the first; the average price of eggs for the same season was some-

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[1] See pp. 66–102.

what higher in the second decade, in consequence of the conditions already mentioned as affecting the price of eggs. The average prices of both commodities for the seasons of abundant production were somewhat higher in the second decade. These facts point to an influence of cold storage in the direction of lowering prices during the season of scarcity by increasing the supply offered for sale, and raising prices in the season of plenty by taking goods off the market.

4. The extent of price fluctuations of the three commodities was less in the second decade than in the first. The lessened fluctuations of price would seem to be a result of the more even distribution of the supply of perishable food products over the market year facilitated by cold storage.

5. The business of dealing in perishable food products through the medium of cold storage is essentially speculative, but this is a form of speculation which, when properly carried on, performs a legitimate function, — that of adjusting the supply of such products to the demand, thus helping to bring about a lower and steadier range of prices.

6. The facilities offered by cold storage may be abused to manipulate prices, as may the machinery of speculation in general, but liability of serious injury to the consuming public through such action is not great, because of the enormous practical difficulties in the way of artificially controlling the supply of food.

7. The practice on the part of cold-storage companies of negotiating loans for customers on warehousemen's receipts, although legitimate in itself, increases the danger of harmful speculation and market disturbances, but effective control of abuses of this practice seems impossible.

8. The law already provides machinery by which alleged abuses in the way of manipulation of food prices may be investigated and prosecution instituted, through the provisions of chapter 503 of the Acts of 1911.

Need of Legislation.

The commission is of the opinion that, while the effects of cold storage on health and on prices are generally beneficial to the public. there is need of legislation for the regulation of this business. Cold storage is an industry of a public character. It plays a rôle in the distribution of the food supply analogous to that of the railway in the transportation of commodities in general. The railroads are "common carriers;" the refrigerating warehouses are "common storers." A business of this kind should be subject to supervision and control by the State. The object of regulation should be to prevent abuses and protect consumers without imposing on the business unreasonable restrictions that would interfere with its legitimate operations and hamper its proper development. The measures of regulation should be of such a nature as to attain the object sought with a minimum of expense and inconvenience to the business interests affected. This can best be attained by framing the regulative measures in broad terms and investing the administrative authority with discretionary powers in the application and enforcement of the provisions. Accordingly, the commission proposes that extensive powers with respect to the regulation of cold-storage establishments be delegated to the State Board of Health.

Measures of Regulation.

The principal measures of regulation which the commission recommends are, in brief: —

1. Cold-storage warehouses should be subject to the supervision of the State Board of Health, and should be required to take out licenses and submit regular reports. The main object of the proposed inspection is to ensure the proper condition of goods upon entry into storage and their proper treatment during the storage period.

2. Food products deposited in cold storage should be marked with the dates of receipt into storage and of withdrawal from storage. The reason for this requirement is to afford a means of identifying cold-storage commodities as such in the trade, and of conveying to purchasers information to which they are entitled with respect to the commercial history of the food products which they buy, including the length of time goods are held in storage.

3. The time for which food products may be held in cold storage should be limited to twelve months, with discretionary power vested in the State Board of Health to extend the time limit for particular consignments of goods, and also to fix a shorter time limit than twelve months for any article of food, if such further restriction of the storage period should be found upon investigation to be desirable.

The general reasons for imposing a time limit in the case of food products held in cold storage are that such a restriction, supplementing the provisions for inspection, would afford an additional measure of protection to the public against abuses that might arise through undue prolongation of the storage period, would prevent the retention of goods in storage from one year into another, and would create a greater degree of public confidence with respect to cold-storage food, allaying apprehension as to the length of time during which goods are held in cold storage.

In fixing the length of the time limit, two considerations have influenced the commission especially. In the first place, it seems reasonable that the time limit should not be longer than twelve months, as the proper function of cold storage is to carry goods from the flush season through the short season, and not to hold them over into the next market year. In the second place, it seems logical that the time limit should not be made shorter in any case than the period during which the food product in question can be preserved in wholesome condition, if properly handled before and during storage.

Applying these considerations, the commission has decided upon a general time limit of twelve months. There is no evidence which the commission has been able to discover that would warrant the imposition of a shorter time limit than twelve months in the case of any food product, — with the possible exception of eggs, — on the ground that the commodity could not be preserved in wholesome condition for one year. The period of twelve months may be termed the natural seasonable limit, regarded from the economic point of view, and in the absence of reasons for fixing a shorter time limit on health grounds may be prescribed as the legal time limit.

The commission recognizes, however, that circumstances might arise which would justify the extension of the twelve months' limit in particular cases, and also that further investigation might develop reasons for shortening the legal storage period in the case of some particular commodity. The proposal to confer upon the State Board of Health powers of further extension and restriction with respect to the time limit provides for such exigencies in case they arise.

4. The fraudulent sale of cold-storage products as fresh goods should be prohibited. It is generally admitted that the purchaser has a right to know whether he is getting cold-storage or fresh food. A provision requiring that purchasers shall be informed upon this point is a legitimate and desirable measure for the protection of consumers against deception.

5. The return to cold storage of goods that have once been withdrawn and placed on the market for sale to consumers should be prohibited. Such goods are presumably not in fit condition for further storage. The prohibition of restorage

is needed to protect consumers against a practice that unquestionably leads to abuses.

With reference to the scope of the proposed regulations the commission recommends that they shall apply to fresh meat and fresh meat products, fresh food fish, poultry, eggs, butter and such other commodities as may be specified from time to time by the State Board of Health. The reasons for defining the scope of the act in this manner are set forth in the report and need not here be recapitulated.

Object of Proposals.

In conclusion, it should be emphasized that the purpose of the commission in proposing these regulations is to protect the consumers of cold-storage products against abuses through improper handling of goods, undue prolongation of the storage period and deception of purchasers through the sale of cold-storage articles as fresh goods. At the same time, in seeking to accomplish this end, the commission has kept steadily in view the importance of imposing no unreasonable restrictions upon the legitimate operations of cold storage and the proper extension of this business. It is the belief of the commission that the adoption of such reasonable measures of regulation as are here proposed will help to establish popular confidence with respect to cold storage, promote better relations between the cold-storage interests and the public, and place the business on a more satisfactory footing, to the advantage of warehousemen, dealers and consumers alike.

ARTHUR L. NASON, *Chairman.*
F. SPENCER BALDWIN, *Secretary.*
GEORGE F. MEAD.
FRANCIS BATCHELDER.
DAVID W. MURRAY.

2. DISSENTING STATEMENT OF GEORGE F. MEAD AND FRANCIS BATCHELDER.

We wish to express our dissent from so much of the above report as relates to marking on each package the date of delivery by cold-storage companies. We believe that when inspection on entry into cold storage is established, and a time limit is fixed, the length of time for which goods have been held becomes relatively unimportant. We contend that a time limit after proper inspection affords a reasonable guarantee that the goods, when taken out, are in proper condition. Therefore, dating on withdrawal is in our opinion unnecessary and superfluous. It is a well-known fact that goods go into cold storage largely in car lots, and may be marked with comparative ease and leisure, with slight expense; but when withdrawn, they are in most cases delivered with added expense, in small lots, with great haste, to impatient tradesmen for local uses, and to teamsters anxious to make freight deliveries on time. A requirement that goods shall be marked with the date of withdrawal would add to the burdens of the cold-storage companies, and would cause great inconvenience to the produce trade, without any commensurate advantage to the consumer, whose interests such legislation is supposed to conserve.

GEORGE F. MEAD.
FRANCIS BATCHELDER.

APPENDIX.

APPENDIX.

A. DRAFT OF BILL.

An Act to regulate the Cold Storage of Certain Food Products.

Be it enacted, etc., as follows:

SECTION 1. The term "cold storage," as used in this act, shall be construed to mean the storage of articles of food at or below a temperature of forty degrees Fahrenheit in cold-storage or refrigerating warehouses.

The term "cold-storage or refrigerating warehouse," as used in this act, shall be construed to mean an establishment employing refrigerating machinery or ice for the purpose of refrigeration, or a place otherwise artificially cooled, in which articles of food are stored for thirty days or more at a temperature of forty degrees Fahrenheit or below.

The term "article of food," as used in this act, shall be interpreted to include fresh meat and fresh meat products, fresh food fish, poultry, eggs, butter, and any other food products that may be specified from time to time by the state board of health, under the authority hereby conferred.

SECTION 2. No person, firm or corporation shall operate a cold-storage or refrigerating warehouse without a license issued by the state board of health. Any person, firm or corporation desiring such a license shall make written application to the board, stating the location of its plant or plants. On receipt of the application the board shall cause an examination to be made into the sanitary condition of said plant or plants, and if they are found to be in a sanitary condition and otherwise properly equipped for the business of cold storage, the board shall cause a license to be issued authorizing the applicant to operate a cold-storage or refrigerating warehouse for and during the period of one year. The license shall be issued upon payment by the applicant of a license fee of ten dollars to the treasurer of the Commonwealth. In the event that any warehouse licensed under the provisions of this section, or any portion thereof, shall be deemed by the state board of health to be conducted in an unsanitary manner, it shall be the duty of the board to close such warehouse, or portion thereof, until it shall be put in sanitary condition, and the board shall have power also to suspend the license in case the needed changes shall not be made within a reasonable time.

It shall be the duty of any person, firm or corporation licensed to operate a cold-storage or refrigerating warehouse to keep an accurate record of the receipts and the withdrawals of articles of food, and the state board of health shall have free access to these records at all reasonable times. Every such person, firm or corporation shall, furthermore, submit a quarterly report to the state board of health on a printed form, to be provided by the board, setting forth in itemized particulars the quantities of food products held in cold storage. Such quarterly reports shall be filed on or before the twenty-fifth day of January, April, July and October of each year, and the reports so rendered shall show the conditions existing on the first day of the month in which the report is filed. The state board of health shall have the authority to require such reports to be made at more frequent intervals than the times herein specified, if in the judgment of the board more frequent reports shall be needed in the interest of a proper enforcement of this act, or for other reasons affecting the public welfare.

Section 3. No article of food intended for human consumption shall be placed in cold storage if deemed by the state board of health to be diseased, tainted or otherwise unwholesome, or if not slaughtered, handled and prepared for cold storage in accordance with such rules and regulations as may be prescribed by the state board of health for the sanitary preparation of articles of food for cold storage, under the authority hereinafter conferred.

It shall be the duty of the state board of health to inspect and supervise all cold-storage or refrigerating warehouses in this Commonwealth, and to make such inspection of the entry of articles of food therein as the board may deem necessary to secure proper enforcement of this act. The members of the board, or its duly authorized agents, inspectors or employees, shall be permitted access to such establishments and all parts thereof at all reasonable times for purposes of inspection and enforcement of the provisions of this act, or any other relating to food products. The board may also appoint and designate such person or persons as it deems qualified to make the inspections herein required.

SECTION 4. All articles of food when deposited in cold storage shall be marked plainly with the date of receipt on the containers in which they are packed, or, if not packed in containers, on or in connection with the articles, and when removed from cold storage shall be marked plainly with the date of withdrawal, in accordance with such forms as may be prescribed by the state board of health, under the authority hereinafter conferred.

SECTION 5. No article of food shall be held in cold storage within this Commonwealth for a longer period than twelve calendar months, except with the consent of the state board of health as hereinafter provided.

The state board of health may, upon application, grant permission to extend the period of storage beyond twelve months for a particular consignment of goods, if the goods in question are found, upon examination, to be in proper condition for further storage at the end of twelve months. The length of time for which further storage is allowed shall be specified in the order granting the permission. A report on each case in which such extension of storage may be permitted, including information relating to the reasons for the action of the board, the kind and the amount of goods for which the storage period was extended, and the length of time for which the continuance was granted, shall be included in the annual report of the board.

The state board of health is hereby further empowered, after such investigation as it considers necessary, to determine whether or not a shorter time limit than twelve months may be desirable in the case of any article of food, and to name a specified number of months less than twelve which shall thereafter be the time limit of storage for such article of food. Such action by the board shall be taken only after a public hearing on each proposal of a shorter time limit than twelve months. Any time limit shorter than twelve months which may be fixed by the board of health, in the exercise of the power herein conferred, shall go into effect thirty days after written notice has been sent to all persons, firms or corporations licensed to operate cold-storage or refrigerating warehouses, informing them of the decision of the board.

SECTION 6. It shall be unlawful to sell, offer or expose for sale articles of food which have been held in cold storage without notifying persons purchasing, or intending to purchase, the same that they have been so kept.

SECTION 7. It shall be unlawful to return to cold storage any article of food that has once been released from such storage for the purpose of placing it on the market for sale to consumers, but nothing in this section shall be construed to prevent the transfer of goods from one cold-storage or refrigerating warehouse to another, provided that such transfer is not made for the purpose of evading any provision of this act.

SECTION 8. Broken eggs packed in cans, if not intended for use as food, when deposited in cold storage shall be marked by the owners in accordance with forms prescribed by the state board of health, under the authority hereinafter conferred, in such a way as plainly to indicate the fact that they are not to be sold for food.

SECTION 9. The state board of health may make rules and regulations to secure a proper enforcement of the provisions of this act, including rules and regulations with respect to the sanitary preparation of articles of food for cold storage, the use of marks, tags or labels, and the display of signs, and may fix penalties for the breach thereof.

SECTION 10. Any person, firm or corporation violating any of the provisions of this act shall upon conviction be punished for the first offence by a fine not exceeding ——, and for the second offence by a fine not exceeding ——, or by imprisonment for not more than —— days, or by both such fine and imprisonment.

SECTION 11. All acts and parts of acts conflicting with the provisions of this statute are hereby repealed.

SECTION 12. This act shall take effect upon its passage.

B. COLD STORAGE ACTS OF OTHER STATES.

1. California.

CHAPTER 118.

AN ACT REGULATING THE SALE OF COLD-STORAGE EGGS AND BUTTER, REPRESENTED TO BE FRESH EGGS AND BUTTER, AND FIXING A PENALTY FOR THE VIOLATION THEREOF.

(Approved March 6, 1911.)

The people of the State of California, represented in senate and assembly, do enact as follows:

SECTION 1. Every person, firm, company or corporation, who sells or offers for sale any cold storage eggs or butter, as and for fresh eggs or butter, or who by any means whatever represents the same to be fresh eggs or butter is guilty of a misdemeanor.

CHAPTER 180.

AN ACT TO REGULATE THE SALE OF EGGS AND BUTTER THAT HAVE BEEN IN COLD STORAGE FOR A LONGER PERIOD THAN THREE MONTHS, REQUIRING THE LABELING THEREOF BY ALL PERSONS SELLING OR OFFERING THE SAME FOR SALE, EMPOWERING AND DIRECTING THE STATE BOARD OF HEALTH TO MAKE RULES AND REGULATIONS TO CARRY THIS ACT INTO EFFECT AND FIXING PENALTIES FOR THE VIOLATION OF THE SAME, OR ANY OF THE PROVISIONS.

(Approved March 14, 1911.)

The people of the State of California, represented in senate and assembly, do enact as follows:

SECTION 1. For the purpose of this act the words "person, firm, company or corporation" shall include wholesalers, retailers, jobbers, and every place where eggs or butter that have been in cold storage for a longer period than three months are sold or offered for sale.

SECTION 2. Every person, firm, company or corporation, who sells or offers for sale any eggs or butter that have been in cold storage for a longer period than three months shall before so doing cause to be stamped, marked or branded upon all sides of each receptacle holding and containing the same in black-faced letters two inches in length the period of time during which the same have been in cold storage.

SECTION 3. That every person, firm, company or corporation selling or offering for sale any cold storage eggs or butter, shall display in a conspicuous place in his or their salesroom, a sign bearing the words "Cold storage eggs or butter sold here" in blackfaced letters not less than six inches in length, upon a white ground.

SECTION 4. Every person, firm, company or corporation, who shall fail to comply with any of the provisions of this act is guilty of a misdemeanor and punishable by imprisonment in the county jail for a term not exceeding six months, or a fine of $250.00 or both fine and imprisonment.

SECTION 5. The state board of health is hereby authorized and directed to make rules and regulations necessary to carry this act into effect.

SECTION 6. This act shall take effect immediately.

2. Delaware.

CHAPTER 177.

GENERAL PROVISIONS RESPECTING TRADE.

AN ACT RELATIVE TO COLD STORAGE AND REFRIGERATING WAREHOUSES AND PLACES, AND THE SALE OR DISPOSITION OF THE FOOD KEPT OR PRESERVED THEREIN.

Be it enacted by the Senate and House of Representatives of the State of Delaware in General Assembly met:

SECTION 1. The term food as used in this act shall include any article used for food or drink by man or animal, with the exception that it shall not include and apply to the storing and refrigerating of fruits, or of fish.

SECTION 2. It shall hereafter be unlawful for any person or persons, corporation or corporations, engaged in the business of cold storage warehousemen, or in the business of refrigerating, to receive any kind of food, with the exception of fruits, or fish unless the said food or the package containing the same is branded, stamped or marked, in some conspicuous place, with the day, month and year when the same is received for storage or refrigerating.

SECTION 3. It shall be unlawful for any person or persons, corporation or corporations, engaged in the business of cold storage warehousemen or in the business of refrigerating within the State of Delaware, to permit any article of any kind whatsoever, used for food, now in the possession of any person or persons, corporation or corporations now engaged in the business of cold storage warehousemen or refrigerating, to be taken from their possession without first having branded, stamped or marked on the said stuffs or the package containing the same, in a conspicuous place, the day, month and year when said food stuffs or package was received by any person or persons, corporation or corporations engaged in the business aforesaid.

SECTION 4. It shall hereafter be unlawful for any person or persons, corporation or corporations, engaged in the business of cold storage warehousemen or refrigerating within the state of Delaware, to keep in storage for preservation or otherwise any kind of food or any article used for food for a longer period than six calendar months without the consent granted as hereinafter provided by the Board of Health having jurisdiction, or its duly authorized agents or officers, or except as hereinafter otherwise provided.

SECTION 5. The State Board of Health or the local Board of Health within the limits of any municipal corporation having such local Board, is vested with full power and authority to inspect and supervise all places in the State of Delaware now used or hereafter to be used for cold storage or refrigerating purposes; the members of the Board of Health having jurisdiction as aforesaid, or the duly authorized agents or employees of said Board shall be permitted access to such place or places and all parts thereof at all times for the purpose of seeing that said place or places are kept and maintained in a clean and sanitary manner, and for the purpose of determining whether or not the provisions of this act or any other act relating to food stuffs are being complied with. The power or supervision hereby granted shall extend to enable the State Board of Health as aforesaid to adopt such reasonable rules and regulations as may be determined upon from time to time as essential to the proper protection of the consumer of the commodities kept and preserved in such place or places, and the Board of Health having jurisdiction as aforesaid may appoint and designate from time to time such person or persons as they deem fit for the purpose of making such inspection.

SECTION 6. All persons or corporations engaged in the business of cold storage warehousemen or in the business of refrigerating in the state of Delaware shall submit a quarterly report to the Board of Health having jurisdiction as aforesaid upon printed forms to be provided by said Board of Health, setting forth in itemized particulars the quantity of each and every food stuff in storage or in the control of said person or persons, corporation or corporations; said quarterly report shall be filed on or before the twenty-fifth day of January, April, July and October of each year, and reports so rendered shall show conditions existing upon the first day of the month in which said report is filed.

SECTION 7. In the event of any food or any article used for food being kept or maintained in refrigerating or cold storage places for a longer period than six months, report of such fact shall be filed by the person or persons, corporation or corporations operating such cold storage or refrigerating place with the Board of Health having jurisdiction as aforesaid, upon blanks so provided by said Board of Health upon application, and no such food or article used for food shall, after the expiration of said period of six months, be delivered to any person or persons, corporation or corporations, without a certificate from the Board of Health having jurisdiction as aforesaid first had and obtained authorizing such delivery. Power is hereby given to said Board of Health, or its proper agents, to extend the time when any particular food stuff or article used for food may be kept, maintained or preserved in such place or places, but in no event shall permission be given to keep or maintain or preserve any food stuff for a longer term than eight months from the date of its reception in such place or places.

SECTION 8. The transfer of any food from one cold storage or refrigerating warehouse to another for the purpose of evading any provision of this act is hereby prohibited.

SECTION 9. Any food kept or preserved in any cold storage warehouse or refrigerating place for a longer period than herein provided for shall be sold at public auction by the person or persons, corporation or corporations having the custody of the same, and at the place where the same is kept or preserved, within sixty days after the time limited for the keeping or preserving thereof, unless said food has been condemned as unfit for use by the Board of Health having jurisdiction as aforesaid, in which case it shall be destroyed or otherwise disposed of under such conditions as the said Board of Health may prescribe.

SECTION 10. That it shall be unlawful for any person or persons, corporation or corporations, firm or agent to dispose of poultry or game within the State of Delaware, that has not been drawn before being placed in cold storage. And that it shall be unlawful for any person or persons, corporation or corporations, firm or agent to dispose of any eggs that have been kept in cold storage except from the original crate or package, said crate to be marked with the date when said eggs were placed in said cold storage or refrigerator.

SECTION 11. Any person or persons, corporation or corporations, or officer or officers thereof, violating any of the provisions of this act shall be guilty of a misdemeanor, and upon conviction thereof shall pay a fine of not less than one hundred dollars or more than one thousand dollars, or shall be imprisoned for a term not less than sixty days or more than one year, or shall be sentenced with a fine or imprisonment or both in the discretion of the Court.

SECTION 12. Nothing in this act shall be held to affect or apply to the storing or refrigerating of fruits or fish.

SECTION 13. This Act shall take effect immediately upon its approval.

Approved April 19, A. D., 1911.

3. Kansas.

REFRIGERATED UNDRAWN POULTRY.

CHAPTER 187—SESSION LAWS OF 1907.

AN ACT TO PROHIBIT THE SALE OF REFRIGERATED UNDRAWN SLAUGHTERED POULTRY, GAME, AND FISH, AND FOR THE PROTECTION OF SLAUGHTERED FRESH MEATS, AND PROVIDING PENALTIES FOR VIOLATION THEREOF.

Be it enacted by the Legislature of the State of Kansas:

SECTION 1. That every person who shall offer or expose for sale at retail, for human food, at any public market, store, shop or house, or in or about any street or other public place, any slaughtered domestic or wild fowls, rabbits, squirrels, or other small animals, wild or tame, that have been preserved by refrigeration or cold storage, unless the entrails, crops and other offensive parts are properly drawn and removed, shall be guilty of a misdemeanor, and upon conviction shall be subject to a fine of not less than fifty dollars nor more than one hundred dollars for each offense.

SECTION 2. That every dealer in slaughtered fresh meats, fish, fowl, or game, for human food, at wholesale or retail, at any established place, or as a pedlar, in the transportation of such food from place to place to customers shall protect the same from dust, flies and other vermin or substance which may injuriously affect it, by securely covering it while being so transported. Every violation of this provision shall be a misdemeanor, punishable by a fine of not less than ten dollars or by imprisonment in the county jail for not less than ten days.

SECTION 3. This act shall be in force and effect from and after its publication in the official state paper.

Approved February 7, 1907.

Published February 9, 1907.

4. Indiana.

CHAPTER 71, ACTS 1911.

Title. AN ACT FOR THE PROTECTION OF THE PUBLIC HEALTH AND THE PREVENTION OF FRAUD AND DECEPTION BY REGULATING COLD STORAGE AND REFRIGERATING WAREHOUSES, THE HOLDING OF FOOD PRODUCTS STORED THEREIN AND THE SALE OF SUCH PRODUCTS, AND DEFINING THE DUTIES OF THE STATE BOARD OF HEALTH IN RELATION THERETO. *Approved March 2, 1911.*

Pure Food — Cold Storage Regulation. SECTION 1. *Be it enacted by the General Assembly of the State of Indiana,* That all food products which are placed or stored in any cold storage or refrigerating warehouse in this state shall be marked, stamped or tagged, either upon the product itself or on the original package in which it is enclosed, with the date when it is placed or stored in any such cold storage or refrigerating warehouse; and all such food products when removed from any such cold storage or refrigerating warehouse shall in addition be marked, stamped or tagged with the date when such product was removed from any such cold storage or refrigerating warehouse: *Provided, however,* That when such products are removed for interstate shipment such marking, stamping or tagging shall not be required. And for the purpose of this act a cold storage or refrigerating warehouse shall be defined as one employing refrigerating machinery or ice for the purpose of refrigeration, whether for public or private use, and shall not apply to ice boxes used for temporary protection only.

Storage Limit. SEC. 2. That all food products which shall be placed or stored in any cold storage or refrigerating warehouse after the passage of this act, shall not be kept in such cold storage or refrigerating warehouse for a longer period than nine months after the same has first been placed or stored therein, nor placed or stored in any other cold storage or refrigerating warehouse after nine months from the time when such food products were first placed in a cold storage or refrigerating warehouse: *Provided, however,* That any meat, fish, butter, cheese, eggs, poultry, game, fruits, farm or garden produce, or any other perishable food stuffs which shall have been held in cold storage or refrigerating warehouse for more than nine months shall be reported by the person, firm or corporation operating such cold storage or refrigerating warehouse to the state board of health, and any such food product shall be inspected and if found to be unfit for human food shall be delivered forthwith to and before the nearest circuit or city judge or justice of the peace who shall order that such food product shall be drenched with kerosene oil or rendered into grease and tankage or otherwise made unfit for food as the court may direct.

Food Products Now in Storage. SEC. 3. That all food products now in any cold storage or refrigerating warehouse in this state shall be removed from cold storage and placed upon the market within nine months from the passage of this act.

Non-Resident Storage — Mark. SEC. 4. That no food product shall be sold or offered for sale in this state which shall have been placed or stored in any cold storage or refrigerating warehouse outside of this state unless it shall have been marked, stamped, or tagged as provided for in section one of this act.

Sales — When Unlawful — Eggs. SEC. 5. That it shall be unlawful for any person, firm or corporation to sell or have in its possession with the intent of selling, or offering or exposing for sale any package, box, bale, barrel, tub or other receptacle in which any meats, fish, eggs, butter, cheese, poultry, game, fruits, farm or garden produce, or any other perishable food stuffs are packed or contained and which has been taken or removed from any cold storage or refrigerating warehouse, where the stamp showing the date such articles of food were placed in any such cold storage or refrigerating warehouse has been removed, defaced, altered or destroyed, or is not plainly legible, nor shall such person, firm or corporation sell, either at wholesale or retail, any storage eggs as fresh eggs, and all invoices shall plainly state whether such eggs are storage or fresh and when such eggs are sold at retail, in case eggs so sold have been in storage thirty days, there shall be placed in or on the receptacle containing them, in full view of the public, a card not smaller than six inches in width by six inches in length, upon which shall be printed the words "cold storage", in plain gothic letters not less than two inches in length, and the wrapper, bag or container in which said eggs are delivered to the purchaser by the retailer shall be plainly stamped with the words "cold storage".

Record — Receipts and Withdrawals. SEC. 6. That it shall be the duty of any person, firm or corporation carrying on, engaged in, or conducting a business or storing perishable food or keeping or maintaining a cold storage or refrigerating warehouse where meats, fish, butter, cheese, eggs, poultry, game, fruits, farm or garden produce, or any other perishable food stuffs are stored, to keep an accurate record of the receipts and withdrawals of all products so received or withdrawn and the state board of health shall have free access to these records at any time.

License Required — Fee. SEC. 7. That any person, firm or corporation desiring to carry on, engage in or conduct a business of storing perishable food, or to keep, maintain or operate a cold storage or refrigerating warehouse where meats, fish, eggs, butter, cheese, poultry, game, fruits, farm or garden produce, or any other perishable food stuffs are stored, shall make application in writing to the state board of health for that purpose, in which application shall be declared the location at which said business is proposed to be carried on. Upon receipt of the application the state board of health shall cause an examination to be made into the sanitary condition of the place of business occupied by the applicant. If upon examination said place of business is found to be in a sanitary condition, clean and suitable for said purpose, the state board of health shall cause a license to be issued such applicant, authorizing such applicant to carry on said business for and during the period of one year. The said license shall be issued upon payment by such applicant of a license fee of ten ($10) dollars to the treasurer of the state. The license fees so paid shall be held by the treasurer of state as a fund for the enforcement of this act and at the end of each fiscal year the unexpended balance shall revert to the general fund.

All disbursements necessary for the carrying out of this act shall be paid by warrant drawn upon the treasurer of state after the filing with the auditor of state all vouchers and bills as now provided for by law.

In the event that said place of business shall be conducted in an unsanitary manner or in a manner contrary to the provisions of this act, it shall be the duty of the state board of health to revoke said license and to close the cold storage or refrigerating warehouse until such time as it may again be in a sanitary condition, clean and suitable for use.

State Board of Health — Duties. SEC. 8. That it shall be the duty of the state board of health to enforce the provisions of this act and for this purpose the state food and drug commissioner, the food inspectors of the state board of health, and the state, county and city and town health officers shall have full power at all times to enter every building, room, basement or cellar occupied or used or suspected of being occupied or used as a cold storage or refrigerating warehouse and to inspect the premises, and if upon such inspection any cold storage or refrigerating warehouse or any employer, employe, or other person is found to be violating any of the provisions of this act, or if the meats, fish, eggs, butter, cheese, poultry, game, fruit, farm or garden products or any other perishable food stuffs stored therein are not marked, stamped or tagged in accordance with the provisions of this act, or are found to be unfit for food, the officer or inspector making the inspection shall furnish evidence of said violation to the prosecuting attorney of the county or circuit wherein such violations occur, who shall prosecute all persons violating any of the provisions of this act. The state board of health shall adopt such rules as may be necessary to enforce this act and violation of said rules shall be punished on conviction as set forth in section 9 of this act.

Penalty. Sec. 9. That any person, firm or corporation violating any of the provisions of this act shall upon conviction be punished for the first offense by a fine of not less than $25.00 nor more than $50.00; for the second offense by a fine of not less than $50.00 nor more than $100.00; and for the third or subsequent offenses by a fine of $200.00 and imprisonment in the county jail for not less than thirty (30) nor more than ninety (90) days and each day on which the cold storage or refrigerating warehouse is found to be in violation thereof, or the employer, employe, or other person is found to be violating any of the provisions of this act, shall constitute a distinct and separate offense.

Repeal. Sec. 10. All acts and parts of acts in conflict with the provisions of this statute are hereby repealed.

5. New Jersey.

Chapter 189 of the Laws of 1911.

An Act relating to Cold Storage and Refrigerating Warehouses and Places, and the Sale or Disposition of the Food kept or preserved therein.

1. The term food as used in this act shall include any article used for food except liquid food.

2. It shall hereafter be unlawful for any person, persons, or corporation engaged in the business of cold storage warehousemen, or in the business of refrigerating, or who own, operate, control or lease any cold storage or refrigerating plant to receive, nor shall any such person, persons or corporation place therein any article of food unless said food or the package containing the same is branded, stamped, or marked in some conspicuous place, upon the receipt thereof, with the day, month and year when the same was received for storage or refrigerating, and it shall be unlawful for any such person, persons or corporation to receive any article of food which has been kept in cold storage without the state, unless at the time of such receipt such article offered is branded, stamped or marked with the day, month and year when it was placed in the cold storage in such other state, or such person, persons or corporation shall have obtained the consent of the state board of health to receive such article of food.

3. It shall be unlawful for any person, persons or corporation engaged in the business of cold storage warehousemen or in the

business of refrigerating, or who own, operate, control or lease any cold storage or refrigerating plant, to permit any article of any kind whatsoever used for food now in the possession of any person, persons or corporation now engaged in the business of cold storage warehousemen or refrigerating, or who own, operate, control or lease any cold storage or refrigerating plant, to be taken from their possession without first having branded, stamped or marked on said article of food or the package containing the same, in a conspicuous place, the day, month and year when said article of food or package was received by any such person, persons or corporation engaged in the business aforesaid, or by any person, persons or corporation owning, operating, controlling or leasing any cold storage plant.

4. It shall hereafter be unlawful for any person, persons or corporation engaged in the business of cold storage warehousemen or refrigerating, or who own, operate, control or lease any cold storage or refrigerating plant, to keep in storage for preservation or otherwise any article of food a longer period than ten calendar months without the consent, as herein provided, of the state board of health, or its duly authorized agents or officers, or except as hereinafter otherwise provided.

5. The State Board of Health is hereby vested with full power and authority, and it shall be the duty of said board, to inspect and supervise all places in this state now or hereafter used for cold storage or refrigerating purposes; the members of the state board of health or its duly authorized agents or employees of said board shall be permitted access to such place or places and all parts thereof at all times for the purpose of seeing that said place or places are kept and maintained in a clean and sanitary condition, and for the purpose of determining whether or not the provisions of this act or any other act relating to articles of food are being complied with. The state board of health is hereby granted power and authority to adopt such reasonable rules and regulations as may be essential to the proper protection of the consumer of the commodities kept and preserved in such place or places, and the state board of health may appoint and designate from time to time such person or persons as said board may deem fit for the purpose of making such inspection.

6. All persons or corporations engaged in the business of cold

storage warehousemen or in the business of refrigerating, or who own, operate, control or lease any cold storage or refrigerating plant, shall submit a quarterly report to the state board of health, setting forth in itemized particulars the quantity of each and every article of food in storage, or in the control of said person or persons, corporation or corporations; said quarterly report shall be filed on or before the twenty-fifth day of January, April, July and October of each year, and reports so rendered shall show conditions existing upon the first day of the month in which said report is filed.

7. In the event of any food or any article used for food, being kept or maintained in refrigerating or cold storage places for a longer period than ten months, report of such fact shall be filed by the person, persons, or corporation operating such cold storage or refrigerating place, or by those owning, operating, controlling or leasing any cold storage or refrigerating plant with the state board of health, upon blanks to be provided by said state board of health upon application, and no such food or article used for food shall, after the expiration of said ten months, be delivered to any person, persons, or corporation without a certificate from the state board of health first had and contained authorizing such delivery. Power is hereby given to said Board of Health, or its proper agents, to extend the time when any particular food stuff or article used for food may be kept, maintained or preserved in such place or places.

8. The transfer of any food from one cold storage or refrigerating warehouse to another, for the purpose of evading any provision of this act, is hereby prohibited.

9. When food which has been in cold storage is released therefrom for the purpose of placing on the market for sale, it shall be a violation of the provisions of this act to knowingly again place such food in cold storage.

10. Any article of food kept or preserved in any cold storage warehouse or refrigerating place for a longer period than herein provided, after at least twenty days' notice to the owner or consignor of such article of food to remove the same, shall be sold at public auction by the person, persons or corporation having the custody of the same, and at the place where the same is kept or preserved; such sale shall be within thirty days after the time limited for the keeping

or preserving thereof, and the proceeds of such sale shall be paid to the owner or consignor thereof after deducting storage or other charges thereon, unless said food has been condemned as unfit for use by the state board of health, in which case it shall be destroyed or otherwise disposed of under such conditions as the state board of health may prescribe.

11. Any person, or persons, corporation or corporations, or officer or officers thereof violating any of the provisions of this act, shall, upon conviction, be subject to a penalty of not exceeding five hundred dollars for the first offense. Any such person or persons, corporation or corporations, or officer or officers thereof, having once been convicted of violating any provisions of this act, shall upon a second offense be held guilty of a misdemeanor. The conviction of any corporation shall not operate to relieve any officer or officers, agents or employes of such corporation from prosecution under the provisions of this act.

12. If any paragraph or provision of this act shall be questioned in any court and held to be invalid, the remainder of this act shall not be invalidated thereby, but shall remain in full force and effect.

13. All acts or parts of acts inconsistent herewith are hereby repealed.

14. This act shall take effect immediately.

Approved April 21, 1911.

6. New York.

Chapter 335.

An Act to amend the Public Health Law, relating to Cold Storage and Refrigerating Warehouses and Places, and the Sale or Disposition of the Food kept or preserved therein.

Became a law June 15, 1911, with the Approval of the Governor. Passed, three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. Chapter forty-nine of the laws of nineteen hundred and nine, entitled "An Act in relation to the public health, constituting chapter 45 of the consolidated laws," is hereby amended by adding after article sixteen thereof, a new article, to be article sixteen-a, to read as follows:

ARTICLE 16-A.

Cold Storage.

Section 335. Definitions.
336. Cold storage food to be marked.
337. Time that cold storage food may be kept.
338. Powers of state commissioner of health.
339. Reports of warehousemen.
339-a. Transfers from one warehouse to another.
339-b. Prohibits return of food to cold storage when once released for purposes of placing same on market for sale.
339-c. Prohibits sale of food kept in cold storage without representing said fact.
339-d. Penalties.

335. *Definitions.* The term food as used in this article shall include any article, except nuts, fruits, cheese and vegetables, used for food by man or animal and every ingredient of such article.

336. *Cold storage food to be marked.* It shall hereafter be unlawful for any person or persons, corporation or corporations, engaged in the business of cold storage warehousemen or in the business of refrigerating, to receive any kind of food unless the said food is in an apparently pure and wholesome condition, and the food or the package containing the same is branded, stamped or marked, in some conspicuous place, with the day, month and year, when the same is received in storage or refrigeration.

It shall be unlawful for any person or persons, corporation or corporations, engaged in the business of cold storage warehousemen or in the business of refrigerating to permit any article of any kind whatsoever used for food in the possession of any person or persons, corporation or corporations, engaged in the business of cold storage warehousemen or refrigerating, to be taken from their possession without first having branded, stamped or marked on said food stuffs or the package containing same, in a conspicuous place, the day, month and year when said food stuffs, or package, was removed from cold storage or refrigeration.

337. *Time that cold storage foods may be kept.* It shall hereafter be unlawful for any person, corporation or corporations engaged in the business of cold storage warehousemen or refrigerating, to keep in storage for preservation, or otherwise any kind of food or any article used for food a longer period than ten calendar months, excepting butter products which may be kept in said cold storage or refrigeration twelve calendar months.

338. *Powers of state commissioner of health.* The state commissioner of health is hereby vested with full power and authority to inspect and supervise all places in this state now used or hereafter to be used for cold storage or refrigerating purposes; the state commissioner of health or his duly authorized agents or employees shall be permitted access to such place or places and all parts thereof at all times for the purpose of seeing that said place or places are kept and maintained in a clean and sanitary manner, and for the purpose of determining whether or not the provisions of this article or any other act relating to food stuffs are being complied with. The power of supervision hereby granted shall extend to enable the state commissioner of health to adopt such reasonable rules and regulations as may be determined upon from time to time as essential to the proper protection of the consumer of the commodities kept and preserved in such place or places, and the state commissioner of health may appoint and designate from time to time such person or persons as he deems fit for the purpose of making such inspections.

339. *Reports of warehousemen.* All persons or corporations engaged in the business of cold storage warehousemen or in the business of refrigerating shall transmit reports to the state department of health, upon printed forms to be provided by said state department of health, setting forth in itemized particulars the quantity of each and every food stuff in storage or in the control of said person or persons, corporation or corporations; said reports shall be filed on or before the twenty-fifth day of January, May and September of each year, and reports so rendered shall show conditions existing upon the first day of the month in which said report is filed.

339–a. *Transfers from one warehouse to another.* The transfer of any food from one cold storage or refrigerating warehouse to another for the purpose of evading any provisions of this article is hereby prohibited.

339–b. *Prohibits return of food to cold storage when once released for purpose of placing same on market for sale.* When food has been in cold storage or refrigeration and is released therefrom for the purpose of placing the same on market for sale, it shall be a violation of the provisions of this article to again place such food in cold storage or refrigeration.

339–c. *Prohibits sale of food kept in cold storage without representing said fact.* It shall be a violation of the provisions of this article to sell any article or articles of food that have been kept in cold storage or refrigeration, without representing the same to have been so kept.

339–d. *Penalties.* Any person or persons, corporation or corporations, or officer or officers thereof, violating any of the provisions of this article shall be guilty of a misdemeanor. The conviction of any corporation shall not operate to relieve any officer or officers, agents or employees of such corporation from prosecution under the provisions of this article.

2. This act shall take effect immediately.

C. RULES AND REGULATIONS RELATING TO COLD STORAGE ADOPTED BY STATE BOARDS OF HEALTH.

New York.

The following provisional rules relating to the enforcement of an act entitled "An Act to amend the public health law, relating to cold-storage and refrigerating warehouses and places, and the sale or disposition of the food kept or preserved therein," approved June 15, 1911, have been adopted by the State Commissioner of Health.

These rules are to be regarded as temporary only, and as occasion requires the State Commissioner of Health will amend, alter and supplement them. Due notice of such alteration will be given to all persons interested.

1. For the purpose of enforcing this act the term "cold storage" will be held to mean the storage of foods for a period exceeding thirty days at or below a temperature of 40 degrees Fahrenheit, in establishments, whether public or private, employing refrigerating machinery or ice.

The term "cold-storage warehouse or refrigerating warehouse" will be held to mean an establishment employing refrigerating machinery or ice for the purpose of refrigeration in which foods are stored for thirty days or more at a temperature of 40 degrees Fahrenheit or below.

2. Articles of food intended for cold storage shall, when they are offered for or placed in storage, be enclosed in boxes, barrels, crates or other packages sufficiently strong to protect them from injury, unless the articles are of such a character that it is impracticable to pack them in containers.

3. When articles of food contained in packages are placed in cold storage, each package shall be legibly marked in black and purple ink as follows: The name of the storage company and place in which it is located; below that the words "Cold Storage;" below that the word "Received," followed by the day, month and year when such articles were placed in storage.

The word "Delivered," followed by the day, month and year when such articles were taken from storage, shall be stamped upon such foods or packages before being removed therefrom.

When articles of food not contained in packages are placed in cold storage, each individual article must be marked in the above manner.

All letters or figures must be in plain type not less than three-eighths of an inch in height.

The word "RECEIVED" may be written "Rec'd," and the word "DELIVERED" may be written "Del'd," and figures separated by hyphens may be used to indicate dates and will be regarded as sufficient date if following the words "Rec'd" or "Del'd" as the case may be. The last two figures of the number indicating the year when such foods were placed or taken from storage may be used, *e.g.*: "Received September 1, 1911," may be written: "REC'D 9–1–11," or "Delivered September 1, 1911," may be written: "DEL'D 9–1–11."

Whenever tags are used on which to mark dates, they must be so securely fastened to the article to which they are affixed that they cannot become detached.

4. Articles of food held at low temperature during the process of manufacture will not be regarded as being held in cold storage within the meaning of this act, and such articles need not be dated.

5. The floors, halls, walls, ceilings, furniture, receptacles, implements and machinery of every cold-storage or refrigerating warehouse shall be kept in a clean, healthful and sanitary condition; and, for the purpose of this rule, unclean, unhealthful or unsanitary conditions shall be deemed to exist if the food stored is not securely protected from flies, dust, dirt, insects and from all other foreign or injurious contamination.

6. Toilet rooms shall be separate and apart from the rooms in which food is stored; cuspidors for the use of employees must be washed daily with disinfectant solution.

7. No employer shall knowingly require, permit or suffer any person to work, nor shall any person work, in a cold-storage or refrigerating warehouse who is affected with any infectious or contagious disease.

NEW JERSEY.

1. For the purpose of enforcing this act the term "cold storage" will be held to mean the storage of foods, intended for sale or distribution, in establishments employing refrigerating machinery or

ice for the purpose of refrigeration, for a period exceeding thirty days, at or below a temperature of 40 degrees Fahrenheit; and the term "cold-storage warehouse" will be held to mean any establishment employing refrigerating machinery or ice for the purpose of refrigeration, in which foods intended for sale or distribution are stored at or below a temperature of 40 degrees Fahrenheit for a longer period than thirty days.

2. Articles which are held at low temperatures for temporary protection only, for periods less than thirty days, will not, for the purposes of this act, be regarded as being held in cold storage, and such articles need not be dated, but such articles must be kept in separate rooms or enclosures from which articles are kept in cold storage, and persons operating cold-storage warehouses must keep an accurate record of the date of receipt and removal of such articles, which record shall at all times be open to inspection by agents of the State Board of Health: *provided, however,* that if articles of food which have been kept at a low temperature for temporary protection are held for more than thirty days at such low temperature, they shall then be regarded as having been placed in cold storage, and shall be marked, in the manner provided in rule 4, with the day, month and year when the period of temporary protection began, and such articles shall be removed from the room or enclosure in which articles temporarily protected are kept, and shall be placed in rooms or enclosures used for cold storage.

3. Articles of food intended for cold storage shall, when they are offered for or placed in storage, be enclosed in boxes, barrels, crates or other packages, sufficiently strong and tight to prevent them from being injured by careless handling, unless the articles are of such a character that it is impracticable to pack them in containers.

4. When articles of food contained in packages are placed in cold storage, each package shall be legibly marked in plain figures, not less than three-eighths of an inch in height, with the day, month and year when such articles were placed in storage; and when articles of food not contained in packages are placed in cold storage, each individual article shall be marked in the same manner. Figures separated by hyphens may be used to indicate dates, and it will be regarded as sufficient dating if the last two figures of the number denoting the year when such articles of food were placed in cold

storage are used. For example: June 26, 1911, may be written: 6-26-11.

Whenever tags or labels are used on which dates are to be marked, they must be securely fastened to the articles to which they are affixed.

5. Articles of food held at low temperatures during the process of manufacture will not be regarded as being held in cold storage within the meaning of this act, and such articles need not be dated.

6. When articles of food have been kept in cold storage for ten calendar months, report of such fact shall be made to the State Board of Health by the persons having custody of such articles, and such articles shall be held in cold storage by such persons until they have been inspected by the agents of the State Board of Health and released by order of the Board.

7. Upon receiving applications therefor, the State Board of Health will issue temporary consent to persons operating cold-storage warehouses, permitting them to receive articles of food which have been in cold storage in other States, but which do not bear the dates of entrance into such storage; which consent shall be good only until such articles have been inspected by agents of the State Board of Health. If upon inspection it is found that such articles are in proper condition for further storage, and if it appears that the person having custody of them has been unable to ascertain the date on which they were placed in cold storage in another State, a permanent consent for the storage of such articles may issue. If it is found that such articles are in such a condition that further storage will impair their purity, quality or wholesomeness, permission for further storage will be refused.

8. For the purpose of facilitating the removal of articles of food from cold storage before the expiration of the statutory period of ten calendar months, persons operating cold-storage warehouses shall notify the owners of all articles of food stored by them of the date when such articles will have been in storage ten months, at least fifteen days before such ten months have elapsed.

9. Until further notice, the following classification of foods will be used by persons operating cold-storage warehouses and refrigerating plants in making quarterly reports of articles of food held in cold storage: —

Eggs, case.
Eggs, broken.
Butter.
Cheese.
Poultry.
Game.
Meat, fresh.
Meat, salted, smoked or pickled.
Fish (including shellfish), fresh.
Fish, salted, smoked or pickled.
Dried fruits.
Nuts.
Green fruits.
Green vegetables.
Miscellaneous.

Shell eggs are to be reported in terms of cases and dozens, all other articles to be reported as packages, and, in so far as the same is practicable, by weight. Articles not intended for use as food products not to be reported.

10. Requests for permission to store food for a longer period than ten calendar months must be made by the owners thereof to the State Board of Health, upon blanks which will be furnished by the Board upon application. No such request will be considered by the Board unless a satisfactory reason, stating why such extension of storage is desired, is given.

Before such requests are granted the articles of food to which they refer must be inspected by agents of the Board. Requests should therefore be made at least two weeks before the statutory time limit for storage has expired.

Indiana.

Rule 16. *Cold Storage.* — Passed by the State Board of Health in accordance with the provisions of section 8, chapter 71, Acts of 1911, entitled "An Act for the protection of the public health and the prevention of fraud and deception by regulating cold-storage and refrigerating warehouses, the holding of food products stored therein and the sale of such products, and defining the duties of the State Board of Health in relation thereto."

Par. 1. — For the purpose of the enforcement of this act, it is held that a cold-storage or refrigerating warehouse is an establishment employing refrigerating machinery or ice for the purpose of refrigeration, in which goods are stored for thirty days or more at a temperature of 40 degrees Fahrenheit or below. The words "for temporary protection only," as used in section 1 of the act, shall be construed to mean the holding of food products for not more than thirty days.

Par 2. — Goods placed in cold-storage or refrigerating warehouses which maintain rooms for temporary protection only, as defined in rule 1, shall not be required to be marked, stamped or tagged. Such storage rooms shall keep a full and complete record of the entry and withdrawal of all food products stored therein for temporary protection only.

Par. 3. — Hotels, restaurants and all other places of business employing refrigerating machinery or ice for the purpose of refrigeration, whether for public or for private use, are hereby classed as cold-storage or refrigerating warehouses, except in such instances where the products stored therein are held for less than thirty days.

Par. 4. — Goods held at low temperature during the process of manufacture, as is the case with lager beer, and meat products being cured in pickle or dry salt, shall not be considered to be in storage as defined by this act, and need not be stamped.

Par. 5. — All marking, stamping or tagging shall be plainly legible and shall show the day, month and year of the date of entrance and removal, in letters and figures not less than three-eighths of an inch in height and of a style known as 36-point Gothic No. 8. The letters or figures shall be in black or purple ink, and if the goods are tagged the tag shall be securely fastened on the package by tacks, nails, strings or glue, in such fashion that it cannot be detached.

Par. 6. — All goods on hand at the end of nine months, as described in section 2 of the act, shall be reported to the State Board of Health and inspected and passed as suitable for food and in accord with the provisions of the pure food law, chapter 104, Acts of 1907, and the sanitary food law, chapter 163, Acts of 1909, before being withdrawn. Such inspection shall be made by the inspectors of the State Board of Health or by other persons designated by the State Food and Drug Commissioners to make such inspection.

D. CANADIAN COLD-STORAGE ACT AND STATEMENT OF THE DEPARTMENT OF AGRICULTURE CONCERNING COLD-STORAGE WAREHOUSES.

AN ACT TO ENCOURAGE THE ESTABLISHMENT OF COLD-STORAGE WAREHOUSES FOR THE PRESERVATION OF PERISHABLE FOOD PRODUCTS.

His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows: —

1. This act may be cited as The Cold Storage Act.

2. The Governor in Council may enter into contracts with any person for the construction, equipment and maintenance in good and efficient working order, of public cold storage warehouses equipped with mechanical refrigeration, in Canada, and suitable for the preservation of all food products.

3. The location, plans and specification of every such warehouse, its equipment and the amount to be expended thereon, shall be subject to the approval of the Governor in Council.

4. The Governor in Council may, out of any moneys appropriated by Parliament for the purpose, grant towards the construction and equipment of any such warehouse a subsidy not exceeding in the whole thirty per cent. of the amount expended or approved of in such construction and equipment, and payable in instalments as follows: upon the warehouse being completed and cold storage at suitable temperatures being provided therein, all to the satisfaction of the Minister of Agriculture, a sum not exceeding fifteen per cent of the amount so expended; and at the end of the first year thereafter four per cent of the said amount, and at the end of each of the two next succeeding years two per cent of the said amount; provided that the warehouse is maintained and operated to the satisfaction of the Minister of Agriculture.

5. The Minister of Agriculture may refuse to pay any part of the said subsidy if, in his opinion, the operation of the warehouse has not been of such a character as to provide for the proper preservation of such products as may be stored therein.

6. The Minister of Agriculture may order, and cause to be maintained, an inspection and supervision of the sanitary conditions,

maintenance and operation of such warehouses, and may regulate and control the temperatures to be maintained therein in accordance with the regulations to be made as hereinafter provided.

7. The rates and tolls to be charged for storage in such warehouses shall be subject to the approval of the Governor in Council.

8. For the effective carrying out of the provisions of this Act the Minister of Agriculture may appoint inspectors, who shall have access to all parts of such warehouses at all times.

9. The Governor in Council may make such regulations as he considers necessary in order to secure the efficient enforcement and operation of this act; and he may by such regulations impose penalties not exceeding fifty dollars on any person offending against them; and the regulations so made shall be in force from the date of their publication in The Canada Gazette, or from such other date as is specified in the proclamation in that behalf.

10. Chapter 7 of the statutes of 1897, intituled An Act respecting Cold Storage on Steamships from Canada to the United Kingdom and in certain cities in Canada, is repealed.

SUBSIDIES FOR COLD-STORAGE WAREHOUSES.

There is no country in the world to which cold storage is of more importance than it is to Canada. The large and growing production of perishable food products, and the long distances from market, not only for export trade but for internal trade as well, make the employment of artificial means a necessity for prolonging the life of a large quantity of produce, if it is to reach the consumer in prime condition.

In these days of progress and strong competition from the ends of the earth, the standards of quality are constantly being raised, and the facilities which were adequate a few years ago are no longer sufficient to meet the present needs of the situation.

The prairie provinces of Canada will soon have a large population which will have to be supplied with fruit from other provinces, or from the United States. Proper cold-storage facilities will assist Ontario and British Columbia fruit growers to compete with others in supplying this great market.

Cold Storage for Butter.

The export creamery butter is now well taken care of at Montreal, and is mostly shipped to cold-storage warehouses in that city direct from the creameries. There is, however, much room for improvement in the manner in which the large output of dairy butter is handled, especially that which is intended for home consumption. Half a cent a pound will carry butter in cold storage for several months, and a proper use of cold storage would undoubtedly add more than that amount to the value of the greater part of the dairy butter which is produced in Canada.

Cold Storage for Cheese.

Export cheese is for the most part cold stored at Montreal, and there is not likely to be much change in this respect, unless it be a tendency to store more on the other side of the Atlantic. There is, however, a growing business in storing cheese for home consumption, and when Canadians learn to eat cool cured cheese, say at least six months old, the business will grow still faster. The consumption of cheese will be increased enormously in this country when the people are served with so valuable an article of food in proper condition. Storage for this purpose will be required convenient to both point of production and consumption.

Cold Storage for Poultry.

The business of growing and fattening chickens, and other poultry, can be very materially assisted by the use of cold storage. Without such facilities the killing must be postponed until cold weather sets in, and mistakes are frequently made in killing too soon, with serious financial loss. Cold storage makes the poultry farmer independent of the weather, and the fattening season can be considerably extended by beginning earlier.

Cold Storage for Fruit.

The fruits of Canada are noted for their tender, luscious quality, which is synonymous with saying that they require careful handling and protection, to check the rapidity of their life processes, as compared with the drier and less juicy fruits grown in other climates.

There is no food product grown in Canada which comes within the perishable class to which the use of cold storage can be applied with more benefit than it can be to some of the fruits. The apple is Canada's most important fruit, and not the least dependent upon cold storage if the most is to be made out of the crop. Every farmer who keeps a few barrels of apples for his winter use recognizes the effect of cold storage in prolonging the life of his apples by keeping them in a cellar which will be as cold as possible, without freezing. What is not so generally recognized is the fact that low temperatures are the most effective to this end if the apple is placed therein immediately after being taken off the tree. When this course is adopted the ripening process is checked at a time when it would naturally proceed very rapidly, especially as the warmest weather to which the apple will be exposed is likely to prevail at the time the crop is being harvested. A few days' cold storage at this stage is of more value than as many weeks later on. There are districts in Ontario admirably adapted for the growing of apples, but where the length of the warm season frequently causes great loss and discouragement to the grower by carrying the apple to a stage of maturity which interferes seriously with its keeping quality. Cold storage would be of especial benefit to the apple grower in such localities.

For these reasons it is obvious that the proper location for a cold-storage warehouse intended for apples is as near the point of production as possible.

The great bulk of apples in relation to value, as compared with some other products, is a practical difficulty from the warehouseman's standpoint, because he finds it hard to get remunerative rates. Further, the season is short and other goods are not always to be had in the interval, particularly in a district devoted to fruit growing. The solution of the difficulty would appear to be to organize the cold-storage business on such a basis that it would be credited with a part at least of the enhanced value of the apples, and the logical suggestion is that there should be some form of co-operation among the fruit growers to carry out the idea.

GENERAL.

The foregoing are some of the considerations which prompted the government to adopt the policy of subsidizing new cold-storage warehouses.

The provisions of the cold-storage act have been drafted with a view of securing safe storage for perishable farm products in districts not at present provided with such facilities. The requirements of trade in certain localities have made cold storage an absolute necessity, and in such places the revenue is sure enough to make the investment a fairly safe one, so that it needed no special inducement to secure the capital required to provide the necessary facilities.

There is no intention of giving the subsidy to any business which will come into direct competition with others already established. While it may, at first glance, seem a little unfair to assist the new enterprises, even if noncompetitive, it must be borne in mind that the existing cold-storage warehouses occupy the choice locations, and for that reason some inducement seems to be necessary if similar facilities are to be provided in other localities.

There is a large quantity of perishable produce handled in this country without cold storage, the value and stability of which would be much improved by its use. Where it is possible to get along without cold storage, even if the results are unsatisfactory, the question is not studied so closely, and the improved facilities come more slowly, than is the case where the necessities are greater. It is hoped that the attention which has been drawn to the subject by the adoption of the principles involved in the cold-storage act, and the discussions which will naturally arise thereon, will have an important educational influence in the direction of creating a more general appreciation of the advantages of cold storage and a greater demand for such facilities. It is believed also that this process of education will result in bringing more business to existing cold-storage warehouses.

APPLICATIONS FOR SUBSIDY.

Any person, firm or corporation desiring to take advantage of the provisions of the cold-storage act will be required to furnish full particulars, as provided for by order in Council, and the necessary blank forms will be supplied by the Department of Agriculture on application to the Dairy and Cold Storage Commissioner.

J. A. RUDDICK.
Dairy and Cold Storage Commissioner.

OTTAWA, April, 1907.

E. WHOLESALE PRICES, BY MONTHS, OF BUTTER, EGGS AND POULTRY, IN BOSTON MARKET, 1881–90 AND 1901–10.

	1881.				1882.		
	Butter, Northern Creamery.	Eggs, Western Firsts.	Fowl, Fresh-killed.		Butter, Northern Creamery.	Eggs, Western Firsts.	Fowl, Fresh-killed.
January, .	33	37	10	January, .	36	26	12
February,	34	37	12½	February,	36	30	12
March, .	34	22	14	March, .	38	19	14
April, .	28	17	16	April, . .	40	20	18
May, . .	20	14	17	May, . .	26	16	18
June,	21	15	16	June, .	26	20	18
July, .	24	16	15	July, . .	27	19	18
August,	23	14	16	August, . .	26	22	18
September, . .	30	15	17	September, .	30	23	18
October, .	33	23	16	October, . .	31	24	18
November, .	35	25	16	November,	37	27	17
December,	36	26	14	December,	36	30	18

	1883.				1884		
	Butter, Northern Creamery.	Eggs, Western Firsts.	Fowl, Fresh-killed.		Butter, Northern Creamery.	Eggs, Western Firsts.	Fowl, Fresh-killed.
January, . .	39	29	18	January,	33	30	14
February,	35	27	16	February, .	33	32	15
March, .	30	22	20	March,	32	23	17
April,	24	20	20	April, .	30	21	20
May, . .	27	16	22	May, .	27	15	20
June,	22	18	20	June, . .	21	14½	18
July, .	23	17	20	July,	22	15½	17
August, . .	23	17	21	August,	23	18½	17
September, .	24	17	20	September, .	23	17	17
October, .	30	23	18	October, . .	30	19	17
November, .	30	27	17	November, .	31	25	16
December, .	35	28	16	December, .	31	25	14

E. WHOLESALE PRICES, BY MONTHS, OF BUTTER, EGGS AND POULTRY, IN BOSTON MARKET, 1881–90 AND 1901–10 — *Continued.*

	1885.				1886.		
	Butter, Northern Creamery.	Eggs, Western Firsts.	Fowl, Fresh-killed.		Butter, Northern Creamery.	Eggs, Western Firsts.	Fowl, Fresh-killed.
January, .	28	25	14	January, .	34	24	10
February, .	29	25	15	February, .	33	21	14
March, . .	28	23	16	March, . .	33	22	13
April, .	26	16	17	April, .	30	13	16
May,	22	14	19	May, . .	21	12	15
June, . .	19	13	17	June, . .	18	11½	15
July, . .	20	12½	16	July, . .	19	13½	15
August, .	20	13	16	August, . .	21	15	15
September, .	23	15	16	September, .	23	15	15
October, . .	23	20	16	October, . .	29	20	15
November, .	27	23	16	November, .	28	21	14
December, .	26	24	12	December, .	29	22	13

	1887.				1888.		
	Butter, Northern Creamery.	Eggs, Western Firsts.	Fowl, Fresh-killed.		Butter, Northern Creamery.	Eggs, Western Firsts.	Fowl, Fresh-killed.
January, . .	30	30	10	January, .	27	24	11
February, .	28	30	10	February, .	25	21	13
March, .	22	19	12	March, . .	25	19	13
April, . .	20	15	15	April, .	31	20	15
May, . .	25	14	16	May, .	26	14	16
June, .	18	13	14	June, .	20	15	15
July, . .	21	15	15	July, .	21	17	15
August, . .	24	15	15	August, .	21	17	16
September, .	25	16	15	September, .	22½	17	15
October, . .	25	20	15	October, . .	25	20	16
November, .	26	21	14	November, .	27	23	15
December, .	27	24	13	December, .	30	24	14

E. WHOLESALE PRICES, BY MONTHS, OF BUTTER, EGGS AND POULTRY, IN BOSTON MARKET, 1881–90 AND 1901–10 — *Continued.*

	1889.				1890.		
	Butter, Northern Creamery.	Eggs, Western Firsts.	Fowl, Fresh-killed.		Butter, Northern Creamery.	Eggs, Western Firsts.	Fowl, Fresh-killed.
January,	30	20	12	January,	25	22	11
February,	27	15	12	February,	28	14	12
March,	29	15	15	March,	27	15½	12
April,	25	11½	15	April,	25	14½	14
May,	21	13	16	May,	20	13	14
June,	19	13½	16	June,	16	14½	14
July,	19	14½	15	July,	17	14	14
August,	18½	14	15	August,	20	18	13
September,	20	17	14	September,	25	19	11
October,	25	20	16	October,	24	20	14
November,	25	22	14	November,	26	25	13
December,	25	24	13	December,	27	27	12

	1901.				1902.		
	Butter, Northern Creamery.	Eggs, Western Firsts.	Fowl, Fresh-killed.		Butter, Northern Creamery.	Eggs, Western Firsts.	Fowl, Fresh-killed.
January,	25	23	8	January,	24½	26	9
February,	23	21	8	February,	26	28	10
March,	23	16	10	March,	27½	28	10½
April,	22	13	10	April,	27½	15½	11
May,	18	13½	9½	May,	23	16¾	11½
June,	19½	12½	9	June,	23	16½	11½
July,	20	12½	9½	July,	21¾	17	11½
August,	21½	14	10	August,	20½	18	14
September,	20½	16	10	September,	20½	18	12½
October,	22	18	11	October,	23	20	12½
November,	22	23	9	November,	24	21	11
December,	24½	25	9	December,	27	24	12

E. WHOLESALE PRICES, BY MONTHS, OF BUTTER, EGGS AND POULTRY, IN BOSTON MARKET, 1881–90 AND 1901–10 — *Continued.*

	1903.				1904.		
	Butter, Northern Creamery.	Eggs, Western Firsts.	Fowl, Fresh-killed.		Butter, Northern Creamery.	Eggs, Western Firsts.	Fowl, Fresh-killed.
January,	27½	23	12½	January,	24	37	13
February,	26	22	13	February,	23	34	13
March,	26	18	13½	March,	25½	21½	13
April,	26½	15	14	April,	22	17½	14
May,	21½	16	14	May,	21	18	14
June,	22½	16	14	June,	18½	17½	14
July,	20½	16	14	July,	18½	17	13
August,	19½	16	14	August,	18½	20	13
September,	20	20	13	September,	20½	21	14
October,	22	22	14	October,	21½	21½	14
November,	22½	26	11	November,	23	24	13
December,	24	27	14	December,	25	28	13

	1905.				1906.		
	Butter, Northern Creamery.	Eggs, Western Firsts.	Fowl, Fresh-killed.		Butter, Northern Creamery.	Eggs, Western Firsts.	Fowl, Fresh-killed.
January,	27	27	12	January,	25	26	13
February,	29½	30	14	February,	25	19	14
March,	32	33	14	March,	25½	16	14
April,	27½	18	15	April,	24½	17	14
May,	25	18	15	May,	20	17	14
June,	21½	17	15	June,	20	18	14
July,	20½	17	15	July,	20½	18½	14
August,	22	19½	14	August,	22	19	14
September,	20½	21	14	September,	25	23	14
October,	21½	22	14	October,	26½	26	14
November,	23	25	14	November,	27	29	13
December,	23	31	12½	December,	30	35	13

E. WHOLESALE PRICES, BY MONTHS, OF BUTTER, EGGS AND POULTRY, IN BOSTON MARKET, 1881–90 AND 1901–10 — *Concluded.*

	1907.				1908.		
	Butter, Northern Creamery.	Eggs, Western Firsts.	Fowl, Fresh-killed.		Butter, Northern Creamery.	Eggs, Western Firsts.	Fowl, Fresh-killed.
January,	31	27	15	January,	28	28	12
February,	31	28	14	February,	32½	25	13
March,	31	19½	14	March,	31	24	13
April,	30½	18	15	April,	30	16	13
May,	27	18	15	May,	26½	17	15
June,	24½	16	16	June,	25	17	15
July,	25½	16½	15	July,	23½	18	14
August,	25	17½	14½	August,	23½	20	14
September,	28	21	15	September,	25	20	14
October,	31½	22	15	October,	27½	22	14
November,	26½	27	12	November,	28½	30	12
December,	27	29	13	December,	31	36	13

	1909.				1910.		
	Butter, Northern Creamery.	Eggs, Western Firsts.	Fowl, Fresh-killed.		Butter, Northern Creamery.	Eggs, Western Firsts.	Fowl, Fresh-killed.
January,	31½	31	13	January,	34	32	14
February,	30	33	14	February,	31	30	16
March,	29	21½	16	March,	32	23	16
April,	29	21	16	April,	31½	22½	17
May,	28½	23½	15	May,	30½	21½	17
June,	26½	22½	16½	June,	28½	21	17
July,	26½	22	15	July,	28½	20	17
August,	27	23	15	August,	28½	20	16
September,	30½	23	16	September,	30½	23	15
October,	31½	24½	15	October,	29	24	16
November,	32	28	15	November,	30	28	14
December,	32	28	14	December,	30	30	14

WHOLESALE PRICES OF COLD-STORAGE EGGS, 1900–10.

	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.
January,	14	21	20	20½	32	20½	20	23	18½	28	26
February,	11	18		18	–	25	13	24	22	30	26
March,	11	15		14	–	30	12				–
April,			–		–				–		
May,			–			–		–			
June,			–								
July,	–						–				
August,	–						–			–	
September,	17			20			22½	21	22	25	26
October,	17½	17½	21	21	20	21	23	21	22	25½	26
November,	17½	18	20	21½	19½	21½	22½	19	23½	25½	25
December,	21	19	21	24	21½	22	24	19	26½	24	25

F. STATISTICS OF PUBLIC REFRIGERATING CONCERNS IN MASSACHUSETTS.

The commission gathered information concerning the extent and nature of the business of all public refrigerating plants in the Commonwealth. This information was furnished in reply to a circular letter calling for the data: —

1. Name of your firm, partnership or corporation?
2. What is the amount of the capital stock?
3. When did you first begin business?
4. What is the total capacity of your plant in cubic feet?
5. Is the system of refrigeration employed direct or indirect?
6. What are your rates or charges for storage?
7. What kind of goods do you store? (In answering this question please specify in detail. For example, do not state merely "beef, fish, poultry, fruit, etc.," but name the particular kinds of beef, fish, poultry, fruit, etc.)
8. What was the total amount of each kind of product stored during the year April to December, 1910, as enumerated under "7" above? (In answering this question please give the total receipts of each class of goods for the entire twelve-month period, and not the largest amount in storage at any one time.)
9. What was the longest period during which any consignment of each kind of goods was held in storage? (In answering this question state, for example, the longest period for eggs, longest period for butter, longest period for poultry, and so on.)
10. What percentage, if any, of each kind of goods was carried over to another year? (This question does not refer to the calendar year, but to the market year, as it might be termed. The object of the inquiry is to learn whether goods are carried in cold storage mainly from season to season only, or from year to year as well.)
11. Does the local board of health make inspection of your plant? If so, how often?

In presenting the replies that were received, the cold-storage companies are classified in two groups: first, those doing a general refrigerating business; and second, those whose business is confined to fish freezing and refrigeration. In most cases the information is tabulated under the numbers of the questions in the circular of inquiry. In some cases the full information called for was not obtainable, for reasons that appear in the replies. It will be observed that six of these companies do a very small general storage business, namely: Allen, Slade & Company, J. L. Humphrey, Jr., A. C. Hunt & Company, Martha's Vineyard Cold Storage and Ice Company, E. H. Moulton Company, and the New England Cold Storage and Warehouse Company.

1. General Refrigerating Concerns.

ALLEN, SLADE & COMPANY, FALL RIVER.

Our business is not primarily that of cold storage. It is a wholesale grocery business, and we run in connection with the same a cold-storage plant, mostly for our own use in the handling of eggs, butter, etc., but incidentally we do take in considerable fruit, some meats, eggs and a good deal of clothing for outsiders.

Most of the storage of perishable articles is only for a very limited time, running from two or three days to two or three months, for local dealers, who at certain seasons or under special market conditions will buy a stock considerably in excess of their wants and which they wish frozen in anticipation of its being held for some weeks, or until the market should advance, so that at Christmas and New Year we have more or less poultry which dealers are unable to dispose of, and we have stored for local marketmen, at various times, mutton and pork products and livers.

Outside of the storage of clothing our business in outside storage has been quite limited, and it has been more in the storing of fruit than in any animal product, outside, of course, of our own holdings of butter and eggs. Besides eggs and butter we have stored no animal product for a longer period than three or four months, and the longer periods were exceptions to the general custom, for they would be kept ordinarily from two to six weeks. Eggs and butter are kept for longer periods, eggs running about ten to eleven months, and butter about the same period, market conditions influencing altogether the time of storage. As a rule, however, goods are not carried from season to season, for there is a deterioration even under cold storage, and the loss of interest money and the added expense of storing are features that make for the disposal of the goods and their consequent consumption. Things being equal, the quicker the goods are used up the more profit to the owners.

We are under no inspection by the local board of health; at least, if there has been such inspection the writer is not cognizant of the fact.

Our system of refrigeration is a direct one, being run by our own plant, and our boxes have about 30,000 cubic feet capacity. Our charges are a little more than the Boston rates, which to a certain extent govern us, although we are not bound absolutely by them.

In regard to your inquiry about the amount of products stored, we are unable to answer that from the fact that we do not classify the goods we store, and also for the reason that our present plant was not running from January to December, 1910, so that any figures we might give would be of little value to you.

As we are in the wholesale grocery business, and only incidentally doing outside storing, you can see that the capital which we have invested would have very little to do with the value of our general business, and our invested capital could in no sense be reckoned as a cold-storage investment.

Boston Terminal Refrigerating Company.

2. $350,000.
3. March, 1910.
4. About 1,500,000 cubic feet.
5. Both.
6. Rates of storage: —

APPLES.

	BARRELS OF APPLES.		BOXES OF APPLES.	
	500 or Under (Cents).	Over 500 (Cents).	1,000 or Under (Cents).	Over 1,000 (Cents).
First month,	25	20	10	8
Second month,	10	10	4	4
Third month,	10	5	4	2
Fourth month,	10	5	4	2
Fifth month,	5	5	2	2
Sixth month,	5	5	2	2

On all apples remaining in store after expiring dates in April, storage will be charged at the rate of 10 cents per barrel and 5 cents per box per month.

The rate of storage charged on the basis of the above schedule will be determined by the number of barrels or boxes stored by a customer to his or its account during the present season.

The minimum charge on any single invoice will be 10 cents, and the minimum storage charge on any lot will be 25 cents.

BUTTER.

	First Month (Cents).	Second and Succeeding Months (Cents).
Less than 10,000 pounds,	20	15
10,000 to 50,000 pounds,	18	13
50,000 to 150,000 pounds,	17	12
Over 150,000 pounds,	16	11

EGGS.

Monthly Rate. — 10 cents per case per month for first two months; 5 cents per case per month thereafter.

Season Rate. — Less than 400 cases, 42 cents per case; 400 to 4,000 cases, 36 cents per case; over 4,000 cases, 34 cents per case.

POULTRY.

For Less than 10,000 Pounds.

First month or fraction thereof, 20 cents per 100 pounds.

Second month and each following month or fraction thereof, 15 cents per 100 pounds.

For 10,000 pounds to 200,000 pounds.

12 cents per 100 pounds per month or fraction thereof.

For More than 200,000 pounds.

First month or fraction thereof, 12 cents per 100 pounds.

Second month and each following month or fraction thereof, 10 cents per 100 pounds.

7. Turkeys, fowl, chicken, butter, eggs, apples, pears, cheese, nuts, quarters, beef, mutton, box pork, etc.

8. Poultry, 634,605 pounds; butter, 2,468,071 pounds; eggs, 125,132 cases; beef, 1,089,781 pounds.

9. Butter, sixteen months; eggs, eleven months; cheese, fourteen months; poultry, fifteen months.

10. Eggs, none; cheese, 5 per cent.; butter, 10 per cent.; poultry, 5 per cent.

11. Periodical inspection.

EASTERN COLD STORAGE COMPANY, BOSTON.

2. Capital, $350,000; issued, $316,900.

3. In 1897.

4. About 320,000 cubic feet.

5. Direct.

6. From 10 cents to 25 cents per 100 pounds per month, according to quantity.

7. Tongues, hearts, chucks, fores, hinds, beef ribs, loins, lambs, sheep butts, tails, livers and most all cuts; salmon, mackerel, eels, smelt, red snappers, herring, Spanish mackerel, etc.; chickens, fowls, capon, turkeys, ducks, geese and game birds, squabs, etc.; apples, pears, peaches, plums, grapes, pineapples, strawberries, etc.

8. Poultry, 3,699,083 pounds; beef, 1,820,708 pounds; fish, 279,374 pounds; dry fruits and nuts, 897,621 pounds; butter, 1,728,343 pounds.

9. Butter, about fourteen months; poultry and meat, about one year; fruits, less than six months.

10. The percentage is very small, perhaps 5 per cent.

11. We have seen them here once or twice.

EASTERN STATES REFRIGERATING COMPANY, SPRINGFIELD.

2. $600,000.

3. The predecessor of our company began business in 1896.

4. Storage capacity of our Springfield warehouse is 600,000 cubic feet. (This company also operates warehouses at Albany, N. Y., and Jersey City, N. J.; the Springfield plant is the only one covered by the figures here given.)

5. Brine circulation.

6. We have no fixed list of rates, but think that a fair average of rates charged would be as follows: eggs, 35 cents per case per season; butter, 12½ cents per hundredweight per month; meats, 12½ cents per hundredweight per month; apples, 40 cents per barrel per season; cheese, 50 cents per hundredweight per season.

7. Eggs, butter, cheese, poultry, beef, mutton, pork, apples, peaches, dried fruits, nuts, beer, condensed milk, cereals.

8. We keep records as to quantity stored only on the following goods, and our records are so kept that we are not able to separate the different kinds of meats, which meats as given below include poultry: eggs, 77,168 cases; butter 2,611,001 pounds; meat, 671,303 pounds; apples, 1,659 barrels; cheese, 289,155 pounds.

9. This question we are unable to answer exactly, owing to the manner in which our records are kept, but can say the longest period any eggs are carried would be from April first to March first. Butter: while we usually carry butter only from season to season, we believe that there is at the present time some butter in our warehouse which was put in during 1910, but the quantity would, of course, be comparatively small. Meat: we have no way of ascertaining how long this meat which was put in in 1910 stayed in the house, without getting a complete record of the date of

receipt and delivery of each small lot, which of course we would be glad to do if such a course is necessary, but we do not believe, except in cases of mislaid or overlooked lots, that there is any of it which was carried in storage over a year, while the average time in storage was very much less than this. Apples went in during the fall, and we think were all out prior to the first of May this year. On cheese going in during the fall of 1910, we presume there are some small lots still in the house, for, as in the case of butter, there was last year some cheese carried over.

10. As stated in the answer to question 9, butter and cheese were the only articles we know of which were carried over; the butter carried over figures practically 12 per cent., and cheese about 45 per cent.

11. Twice each month.

GLOUCESTER COLD STORAGE AND WAREHOUSE COMPANY, GLOUCESTER.

The Gloucester Cold Storage and Warehouse Company is a corporation with an authorized capital of $100,000, only $80,000 of which has been issued. We began business in the year 1905. The storage capacity of our warehouse in Rockport is 50,000 cubic feet and of the warehouses in this city 350,000 cubic feet. We employ the direct system of refrigeration. We enclose a price list of our rates. We store mostly fish; the only items other than fish stored in the year 1910 were ½ barrel of pears, 20 boxes of livers, 1 box of tongues, 13 boxes of chicken, and 1 box of pork. The longest period in storage of the pork was five months; chicken, five months; liver, one month; tongues, one month; pears, three months.

Beside the above-named articles we stored 12,854 barrels and 80,487 boxes of fish. The longest period any of the fish was in storage was ten months. Nothing was carried over into 1911.

The board of health made their first inspection of this storage about ten days ago. (Report dated October 19.)

We did not have occasion to use the warehouse in Rockport during the year 1910.

Rates of storage: —

Freezing, ½ cent per pound, including first month's storage.

Frozen herring in barrels, short storage, 25 cents per barrel per month.

Frozen herring in barrels, long storage, 20 cents per barrel per month.

Pickled mackerel, 12½ cents per barrel per month.

Pickled mackerel, 7 cents per ½ barrel per month.

Pickled herring, 10 cents per barrel per month.

Pickled herring, 6 cents per ½ barrel per month.

Pickled clams, 10 cents per large barrel per month.

Pickled clams, 7 cents per small barrel per month.

Smoked bloaters, 100 hundredweight, 15 cents per box per season; 3 cents per box per month.

Smoked bloaters, 50 hundredweight, 8 cents per box per season; 1½ cents per box per month.

Smoked halibut, 30-pound boxes, 10 cents per box per season; 2 cents per box per month.

Smoked halibut, 20-pound boxes, 8 cents per box per season; 1¾ cents per box per month.

Smoked herring, 10-pound boxes, 5 cents per box per season; 1 cent per box per month.

Bricks, pressed fish, strips, 40-pound boxes, 12 cents per box per season; 3 cents per box per month.

Bricks, pressed fish, strips, 20-pound boxes, 7 cents per box per season, 1½ cents per box per month.

Crates fish, 50-pound crates, 20 cents per crate per season; 4 cents per crate per month.

Kenched fish, ½ cent per pound per season; ⅛ cent per pound per month.

4 qtls. drums fish, $1.40 per drum per season; ⅛ cents per pound per month.

1 qtl. drums fish, 40 cents per drum per season; ⅛ cent per pound per month.

Fish in barrels or boxes of various weights, ½ cent per pound per season; ⅛ cent per pound per month.

Cases canned mackerel, oysters, lobsters, ½ cent per pound per season; ⅛ cent per pound per month.

Mackerel, 10-pound pails, 10 cents per pail per season; 2 cents per pail per month.

Mackerel, 15-pound pails, 12 cents per pail per season; 2½ cents per pail per month.

Mackerel, 20-pound pails, 15 cents per pail per season; 3 cents per pail per month.

A season consists of six months.

J. L. HUMPHREY, JR., NEW BEDFORD.

In business since 1903; storage capacity, 130,000 cubic feet; system direct expansion; rates or charges are uniform with those of Boston houses.

Ninety per cent. of our storage is devoted to our own business. We do, however, store some beef and fruit for local trade, also pork and lamb; beef being altogether sirloin and roasts, pork being what is known as pork ribs, and the sheep or lamb being whole or half carcasses. We also store apples, pears, peaches or any kind of fruit but the citrus varieties; occasionally freeze a few scallops, but no other fish.

We freeze something like 50 tons of beef, as much of pork and perhaps 10,000 pounds of lamb in a season. Have 3,000 barrels of apples at present.

Plant was built for the butter, cheese, egg and poultry business, and for making ice. We store no butter or cheese for outside parties; have about 500 cases of eggs put in by local dealers in April and May, which they use in the fall. We store 20,000 cases of eggs during the spring, for fall and winter use, for our own trade; 5,000 boxes of cheese, made during the cheese season, for winter use. Butter storage is a very uncertain and variable affair, running anywhere from 1,000 to 8,000 packages. We store it when we cannot sell it; take it out when demand develops.

I have no record of total receipts; stuff comes in and goes out every day from and to all points of the compass.

Seventy-five per cent. of the butter goes out inside of four months, 20 per cent. from four to eight months, and the odds and ends comprising the balance are sold for cooking purposes when bakers are in the market. Less than 5 per cent. of cheese is carried over in a year, there being some demand for "sharp" cheese, which takes time to ripen; practically none is carried over eight months.

Eggs are put under refrigeration as soon as received, two-thirds of them being sold inside of ten days; the balance are sold when receipts are short and are then taken as wanted. We never attempt to carry eggs laid in hot weather, as they deteriorate very rapidly; eggs intended for a long hold are packed in April and May and held for fall and winter use. We never carry any over the tenth of January, and never carry any over into another season, and never heard of any one who ever tried it; they are valueless as soon as the spring flood begins.

We carry 50,000 pounds of poultry, buying turkeys and chickens when they are plenty and cheap, and carrying them over until the time comes when there are none for sale, in the summer. We always carry a few boxes of turkeys until the beginning of the new season, as there is a local demand for such for banquets which must be supplied; such stock will be sold for the Thanksgiving trade and the new season begun. Ordinarily we carry 200 or 300 boxes of chickens until the new crop of chickens arrive, there being no such thing as a fresh young chicken obtainable through the summer and early fall. Such stock is always consumed previous to December 1. Our plant is inspected regularly by the local board of health.

A. C. HUNT & COMPANY, SPRINGFIELD.

2. —

3. Storage was built in 1894 or 1895.

4. About 50,000 or less.

5. Indirect.

6. 30 cents for eggs, 30 cents for apples and pears.

7. No fish, very little beef, some raisins, nuts, cereals.

8. Cannot say.

9. Six to nine months.

10. —.

11. Yes, but they do not regularly. Usually we think about once in four or five weeks. We use most of our storage for our own business, and therefore cannot answer some of the questions as correctly as if we had nothing but storage room for public use.

MARTHA'S VINEYARD COLD STORAGE AND ICE COMPANY, VINEYARD HAVEN.

2. $10,000.

3. May 4, 1908.

4. About 25,000 cubic feet.

5. Direct.

6. We buy and store fish for the market during the winter months, and have but very little storage for other parties; a very few furs, about 100 pounds of butter, not over 1,500 pounds of meat, and possibly 3,000 pounds of fish; depending entirely on local conditions and do not seek any of this business, but take it more as accommodation to our friends, making the charges according to conditions; our total receipts for outside storage amount to about $100 per year.

7. Various kinds of food and bait fish.

8. 410,000 to 412,000 pounds.

9. Ten months.

10. About 10 per cent.

11. No.

EDWIN H. MOULTON COMPANY, HAVERHILL.

This place was built about fifteen years ago, by Edwin H. Moulton, with the intention of doing a cold-storage business, but there was so little business of that kind that the idea was given up, and the plant used by him until within two years for a wholesale beef, provision and produce house, since that time by Edwin H. Moulton Company. We have taken in some small lots as an accommodation to our customers, but it is of so small a nature that I hardly think that it would bring the concern within the scope of your inquiry. Our business has been so small that we have given it very little attention, and our books so incomplete that we could not give a very accurate report.

NEW ENGLAND COLD STORAGE AND WAREHOUSE COMPANY, PITTSFIELD.

2. $5,000.

3. Jan. 1, 1905.

4. 110,000 cubic feet.

5. Indirect.

6. Depending on quantity, kind of articles stored, etc. It would be impossible to answer this except with a great deal of labor.

7. Eggs, butter, turkeys, chickens and ferns.

8. Eggs, 19,800 cases; butter, 2,610 packages.

9. Eggs, ten months; butter, eleven months.

10. Not any.

11. They do not.

QUINCY MARKET COLD STORAGE AND WAREHOUSE COMPANY, BOSTON.

2. $1,000,000.

3. 1881.

4. 10,550,000 cubic feet gross; 4,323,749 cubic feet actual storage goods.

5. Both direct and indirect.

6. Rates of storage: —

APPLES.

	BARRELS OF APPLES.		BOXES OF APPLES.	
	Under 500 Barrels (Cents).	Over 500 Barrels (Cents.)	Under 1,000 Boxes (Cents).	Car Lots or Over 1,000 Boxes (Cents).
First month,	25	20	10	8
Second month,	35	30	14	12
Third month,	45	35	18	14
Fourth month,	55	40	22	16
Fifth month,	60	45	24	18
Sixth month,	65	50	26	20

BUTTER.

	First Month (Cents).	Second and Succeeding Months (Cents).
Less than 10,000 pounds,	20	15
10,000 to 50,000 pounds,	18	13
50,000 to 150,000 pounds,	17	12
Over 150,000 pounds,	16	11

CHEESE.

Rate A. — For customers storing 10 or more tons of cheese the rate will be 8 cents per 100 pounds net per month.

Rate B. — For customers storing less than 10 tons of cheese the rate will be 10 cents per 100 pounds net per month.

EGGS.

Monthly Rate: — One-third of a cent per dozen per month at mark for the first two months, and one-sixth of a cent per month thereafter.

Season Rate: — Less than 400 cases, 42 cents; 400 to 4,000 cases, 36 cents; over 4,000 cases, 34 cents.

FISH.

Smoked and dried bloaters, herring, salmon, codfish, etc.: —

	Monthly Rate.	Season Rate.
Under 10,000 pounds,	12 cents per 100 pounds per month,	60 cents for six months.
Over 10,000 pounds,	11 cents per 100 pounds per month,	55 cents for six months.
Over 20,000 pounds,	10 cents per 100 pounds per month,	50 cents for six months. 57 cents for seven months. 64 cents for eight months.

Fish panned or hung up to be frozen: market cod, haddock, bluefish, mackerel, weakfish, pollock, bass, butterfish, scup, etc., ½ cent per pound for first month; ⅙ cent per pound after first month.

Large fish spread on floor to be frozen: halibut, steak cod, steak pollock, red snappers, etc., ½ cent per pound for first month; ⅙ cent per pound after first month.

For redipping fish there will be a labor charge of 30 cents an hour.

Frozen fish in boxes: ⅙ cent per pound per month; car lots, ⅛ cent per pound per month.

Green herring laid out for freezing; ¼ cent per pound for first month; ⅙ cent per pound after first month.

Frozen herring: 25 cents per barrel per month; 40 cents per cask per month.

Green squid laid out for freezing: ¼ cent per pound for first month; ⅙ cent per pound after first month.

Crates of frozen squid: ⅛ cent per pound per month.

Green fish, clams, oysters, lobsters, etc., in cooler: 20 cents per barrel for fifteen days.

Salt and pickled fish in cold storage in block lots of not less than: —

¼ barrel, 10 cents per month; ½ barrel, 15 cents per month; barrels, 25 cents per month; tierces, 35 cents per month; casks, 50 cents per month; 60 ¼-barrels, 8 cents per month; 40 ½-barrels, 10 cents per month; 20 barrels, 15 cents per month; 15 tierces, 20 cents per month; 10 casks, 35 cents per month.

Poultry.

Rate A. — For customers storing less than 10,000 pounds of poultry during the season the rate will be 20 cents per 100 pounds for the first month stored, and 15 cents per 100 pounds for each month or fraction of a month thereafter.

Rate B. — For customers storing poultry in car lots, or from 10,000 to 200,000 pounds during the season, the rate will be 12 cents per 100 pounds for each month or fraction of a month.

Rate C. — For customers storing more than 200,000 pounds of poultry during the season the rate will be 12 cents per 100 pounds for the first month stored, and 10 cents per 100 pounds for each month or fraction of month thereafter. For holding poultry that is not frozen at a temperature of about 30 degrees Fahrenheit, the rate will be 10 cents per 100 pounds for any time not exceeding two weeks.

7. Different kinds of goods stored: —

- Ale.
- Beef.
- Beer.
- Boxwood.
- Buckwheat.
- Bulbs.
- Butter.
- Cheese: —
  - American.
  - Gorgonzola.
  - Swiss goat milk.
- Cheese — *Con.*
  - Greek goat milk.
  - Roquefort.
  - Sour cream (Hebrew).
  - Pugla.
  - Greek Romonala.
  - Roman.
- Chocolate.
- Cider.
- Cigars.
- Claret.

Corn.
Corn meal.
Confectionery.
Cream.
Condensed milk.
Condensed cream.
Citron.
Clams.
Crabs.
Crab meat.
Cereals.
Caviar.
Dried beef.
Eggs: —
  Dried.
  Frozen in cans.
  Evaporated.
  Desiccated.
  Tanners'.
Fish: —
  Anchovies.
  Alewives.
  Striped bass.
  Black bass.
  Bluefish.
  Bonito.
  Billfish.
  Butterfish.
  Carp.
  Catfish.
  Cod.
  Cusk.
  Cisco.
  Conger eel.
  Frostfish.
  Flounder.
  Haddock.
  Horse mackerel.
  Hake.
  Halibut.
  Herring.
  Kingfish.
  Mackerel.
  Perch.
  Pickerel.

Fish — *Con.*
  Pollock.
  Pompano.
  Redfish.
  Red snappers.
  Salmon.
  Scup.
  Sea bass.
  Shad.
  Shark.
  Smelt.
  Sheephead.
  Sole.
  Squeteague.
  Sand eel.
  Swordfish.
  Tautog.
  Trout.
  Turbot.
  Whiting.
  White perch.
  Whitebait.
  Squid.
  Bluebacks.
  Porgies.
  Porpoise.
  Scallops.
  Shrimp.
  Pickled mackerel.
  Pickled herring.
  Pickled salmon.
  Pickled eel.
  Salt dried pollock.
  Salt dried haddock.
  Salt dried cod.
  Smoked bloaters.
  Smoked halibut.
  Smoked salmon.
  Smoked haddock.
  Smoked hake.
  Smoked cod.
Flour.
Furs.
Frogs' legs.
Ferns.

Fruit juices.
Fruits: —
- Apples.
- Apple waste.
- Apple chop.
- Apricots.
- Bananas.
- Berries.
- Cantaloupes.
- Cranberries.
- Currants, fresh.
- Currants, dried.
- Cherries.
- Candied fruits.
- Dates.
- Evaporated apples.
- Evaporated peaches.
- Figs.
- Fruit juices.
- Grapes.
- Limes.
- Lemons.
- Melons.
- Strawberries.
- Oranges.
- Olives.
- Peaches.
- Pears.
- Plums.
- Pineapple.
- Prunes.
- Raisins.
- Watermelons.
- Ginger Ale.

Game: —
- Black ducks.
- Widgeon.
- Pintail.
- Redhead.
- Bluebills.
- Butterballs.
- Mallards.
- Canvasbacks.
- Plover.
- Walliby.

Game — *Con.*
- Ptarmigan.
- Partridge.
- Gray hen.
- Black cocks.
- Hare.
- Rabbits.
- Quail.
- Snipe.
- Grass-birds.
- Grouse.
- Squabs.
- Pigeons.
- Guinea fowl.
- Venison.
- Bear.
- Moose.
- Woodcock.
- Brant.
- Pheasant.
- Eagle.
- Yellowleg.
- Squirrel.

Hams.
Hogs.
Honey.
Holly.
Herbs.
Jellies.
Laurel.
Leeks.
Lobsters.
Lauretta.
Ivy leaves.
Bronze galax.
Green galax.
Lacouthea spray.
Lard.
Lambs fries.
Livers.
Lambs.
Lamb rounds.
Lamb yearlings.
Lamb springers.
Lamb slippers.

Lamb fores.
Lamb legs.
Lamb saddles.
Lamb chops.
Lamb plucks.
Macaroni.
Maple sugar.
Maple syrup.
Milk.
Milk evaporated.
Mutton.
Magnolia leaves.
Nuts: —
  Almonds.
  Chaberts.
  Cashew.
  Pignolas.
  Pistachios.
  Walnuts.
  Mayettes.
  Peanuts.
  Filberts.
  Pecans.
  Chestnuts.
  Castanas.
  Hickory.
  Cocoanuts.
Oatmeal.
Oil.
Oysters.
Ox tails.
Olive oil.
Oleomargarine.
Orangeade.
Ox tongues.
Porter.
Pork.
Pork loins.
Pork ribs.
Pork shoulders.
Pig tongues.
Pork kidneys.
Plants.
Preserves.
Pickled shoulders.
Pickled tongues.
Pickled hams.
Pickled sheep casings.
Pickled ribs.
Pickled pig's feet.
Pickled pig's ears.
Pickled ox tails.
Pickled tripe.
Poultry: —
  Turkeys.
  Young hen turkeys.
  Old hen turkeys.
  Young Tom turkeys.
  Old Tom turkeys.
  No. 2 turkeys.
  Chickens.
  Western chickens.
  Native chickens.
  Broilers.
  Roasting chickens.
  Milk fed chickens.
  Crammed fed chickens.
  Hot house chickens.
  Dry picked chickens.
  Philadelphia chickens.
  Culls.
  Capons.
  Fowls.
Pine trimmings.
Paschal bread.
Rice.
Sardines.
Sausage.
Syrups.
Sweetbreads.
Sausage casings.
Skins.
Sponges.
Shalots.
Smoked meats.
Salad dressing.
Smilax leaves.
Spaghetti.
Tobacco.
Vermicelli.

Veal.
Vegetables: —
  Asparagus.
  Beans.
  Brussels sprouts.
  Cabbage.
  Carrots.
  Celery.
  Cucumbers.
  Cauliflower.
  Egg plant.
  Hops.
  Horse radish.
  Lettuce.
  Mushrooms.
  Onions.
  Parsnips.
  Potatoes.
Vegetables — *Con.*
  Peas.
  Pickles.
  Parsley.
  Peppers.
  Radishes.
  Rhubarb.
  Sauerkraut.
  String beans.
  Spinach.
  Squash.
  Tomatoes.
  Turnips.
Wheat.
Wheat flour.
Wines.
Woolens.
Yarn.

8. Amount of goods stored during season 1910–11: —

Apples, 64,778 barrels; 76,004 boxes.
Beer, 12,942 half barrels.
Berries, 15,545 quarts.
Butter, 374,168 tubs.
Cheese, domestic, 86,644 boxes.
Cheese, foreign, 5,986 boxes.
Confectionery, 293,464 pounds.
Dried fruits, 2,855,785 pounds.
Eggs, frozen, 792,456 pounds.
Eggs, 430,593 cases.
Fish, 4,728,285 pounds.
Ferns, etc., 6,059 packages.
Flour and cereals, 101,191 pounds.
Game, 2,335 packages.
Grapes, 4,333 packages.
Herring, 9,945 barrels.
Lemons, 11,823 boxes.
Macaroni, etc., 69,614 pounds.
Meat, 4,557,387 pounds.
Nuts, 702,787 pounds.
Oranges and grapefruit, 17,315 boxes.
California and southern fruits, 14,698 boxes.
Oysters and clams, 485 barrels.
Pears, 13,920 boxes.
Poultry, 6,568,674 pounds.
Produce, 8,024 barrels.
Produce, 16,233 crates.
Provisions, 8,004 barrels.
Provisions, 869 tierces.
Syrups and fruit juices, 2,398 barrels.
Syrups and fruit juices, 4,360 gallons in jugs.

9 and 10. It is very unusual for goods to be carried over from one season to the next. Eggs are never carried over. Poultry never, or only in insignificant quantities. In the last twenty-one years butter in some quantity has been held over the season three years. The

largest amount ever so held by this company was 13.6 per cent. of the total amount stored one season.

11. Yes. No records are kept, but frequent visits, at times as often as once a week.

JOHN P. SQUIRE & COMPANY, HOLYOKE.

2. $3,000,000. (This is the total capitalization of the company, which does a large packing and private storage business, the Holyoke plant being only a local branch.)

3. July 1, 1909.

4. 80,000 cubic feet.

5. Direct.

6. Apples and pears, 35 cents to 40 cents per barrel per season; eggs, 35 cents per case per season; fresh meat, ¼ cent per pound for the first month and 1.8 cents per pound for each succeeding month; butter and cheese, ½ cent per pound per season.

7. Fruit: apples, pears and grapes. Poultry: turkeys, fowl, chicken and ducks. Beef: clods, spencer rolls, butts, loins, flanks and plates. Pork: loins. Cereals: rolled oats. Butter, cheese and eggs. Maple sugar, maple syrup and miscellaneous merchandise which might be classified as other than food products, consisting of furs, ferns, Christmas decorations, such as holly, etc.

8. Value of goods stored: —

Fruit: —	
Apples,	$3,600 00
Pears,	60 00
Grapes,	200 00
Poultry (frozen),	3,000 00
Beef: —	
Clods,	3,600 00
Spencer rolls,	300 00
Butts,	450 00
Flanks and plates,	75 00
Loins,	150 00
Pork loins,	3,600 00
Cereal, rolled oats,	140 00
Butter,	25,000 00
Amount carried forward,	$40,175 00

Amount brought forward,	$40,175 00
Eggs,	24,600 00
Cheese,	16,800 00
Maple sugar,	450 00
Maple syrup,	940 00
Miscellaneous merchandise (no one kind of considerable quantity),	1,500 00
Total,	$84,465 00

9. Eggs, nine months; butter, six months; poultry, six months; apples, five months; grapes, two months.

10. No per cent. The only merchandise which we had in stock carried over from last season was 15 boxes of cheese, and this, compared with the total amount of cheese stored, would figure such a small fraction of 1 per cent. that we have answered this question as above.

GENERY STEVENS & SON, WORCESTER.

2. No capital stock.

3. Storage business, 1891; our jobbing business, 1874.

4. About 70,000 cubic feet.

5. Indirect.

6. Butter, 15 cents to 20 cents per 100 pounds; cheese, 12½ cents; eggs, 10 cents per case per month, 42 cents for the season; all kinds of meat, 15 cents to 25 cents per 100 pounds per month.

7. Butter, cheese, eggs, fruits, poultry and pieces of meat for small dealers and hotels. We think we stored one car of beef in 1910.

8. We cannot answer this question except to make an estimate, as the larger part of the goods we store belong to ourselves, and the larger part of the goods we store for other people are goods that we sell them and store for them; and in making an estimate of how much of our goods we put into the freezer it is a very difficult thing for us to satisfy ourselves. We think, however, that 20,000 pounds of beef, 20,000 pounds of pork, 2,000 pounds of mutton, 50,000 pounds of poultry, 400,000 pounds of butter, 150,000 pounds of cheese, 12,000 cases of eggs, 2,000 boxes of dried fruit,

500 boxes of green pears, and 200 barrels of apples would be as near as we could estimate it.

9. We think it safe to say that the limit on butter, cheese and eggs is nine months; also poultry and meat nine months. Occasionally some small lot has been forgotten by the owner and has stayed in a month or two longer than this. We have always made it a point to have our eggs gone by the first of January, and if not gone by the first of January so nearly gone that they would be gone by the first of February. We commenced selling our storage eggs this year the fore part of August. We sell quite a good many eggs under contract to our customers, and we are advising them all to commence using their eggs at once. It is business policy to do this, as the storage eggs are very fine now and give excellent satisfaction, and when eggs are kept into February and March they are not very satisfactory.

10. We do not think there was a tub of butter or any other kind of goods carried over a year, or to the end of the season for that particular grade of goods, except cheese. We always carry some cheese, as we have customers who want some old cheese, and it is considered by a great many better than the newer cheese.

11. The local board of health makes inspection of our plant we think about twelve times a year. We do not think there is much need of legislation on this cold-storage question, as self-protection demands that goods shall not be kept too long, and dealers are coming to realize more fully each year that it does not pay to hold goods too long. If the local inspectors would inspect the goods when they go into storage, it would do a great deal more good than any new laws will do.

Worcester Cold Storage and Warehouse Company, Worcester.

2. $200,000.
3. May, 1906.
4. 200,000 cubic feet.
5. Direct.
6. Regular.
7. Eggs, butter, apples.

8. Eggs, 38,000; butter, 45,407 packages, 2,505,895 pounds; apples, 6,500 barrels.

9. Eggs, nine months; butter, ten months.

10. Nothing.

11. Every two or three months.

2. Fish-freezing Concerns.

BOSTON COLD STORAGE AND TERMINAL COMPANY, EAST BOSTON.

2. Our capital stock is not wholly upon our cold storage.

3. We were incorporated Jan. 1, 1911.

4. About 160,000 cubic feet.

5. Absorption system or direct expansion.

6. Vary as to class of goods.

7. All kinds of fresh, salt and pickled fish.

8. —

9. Six or seven months.

10. No goods were carried over from the last season, with the exception of a small lot of lobster bait.

11. About once every six months.

CONSOLIDATED WEIR COMPANY, PROVINCETOWN.

2. $200,000; about $125,000 refrigeration, balance fish business.

3. 1900.

4. 85,000 cubic feet.

5. Direct.

6. No rates; private company.

7, 8, 9. The following comprise the food fish: —

	Pounds.	Months.
Butterfish,	11,476	9
Flounders,	45,000	4
Haddock,	20,000	2
Scallops,	2,400	5
Scup.	3,800	8
Bone squid,	39,000	8
Whiting,	590,000	10

The following comprise the bait fish: —

	Pounds.	Months.
Blueback herring,	480,000	8
Large herring,	140,000	3
Small herring,	217,000	5
Sand eels,	20,000	4
Sardines,	100,000	5
Shad,	100,000	8
Squid,	160,000	8

10. None.

11. One member on our premises almost every day during the season.

FISHERMAN COLD STORAGE COMPANY, PROVINCETOWN.

2. $60,000.

3. 1907.

4. 100,000 cubic feet.

5. Direct.

6. No storage; we buy and own our stock.

7. Food: Whiting, flounders, herring, butterfish, shad, pollock. Bait: squid, bluebacks, sand eels, spurling, porgies.

8. Amount stored: —

FOOD.	Pounds.	BAIT.	Pounds.
Whiting,	666,615	Squid,	387,259
Flounders,	22,440	Bluebacks,	502,092
Herring,	204,351	Sand eels,	26,020
Butterfish,	6,741	Spurling,	85,571
Shad,	75,187	Porgies,	10,100
Pollock,	3,327		
	978,661		1,011,042

9. The longest time was goods taken in May, 1910, used up in March, 1911.

10. No goods carried over, cleaned up every season. We start our freezer every year about May 1, and are always cleaned out by

the first of the following April, giving us about a month to fix up and make repairs for another season's work.

11. Yes. We invite all inspection at any time.

NEWBURYPORT FISH COLD STORAGE COMPANY, NEWBURYPORT.

2. $30,000.

3. 1908.

4. One million pounds of fish.

5. Absorption system.

6. We handle our own goods only.

7. None except our own.

8. About 800,000 pounds.

9. None consigned; we had 150,000 pounds of pollock from July to February.

10. None at all and never.

11. Do not know.

NORTH TRURO COLD STORAGE COMPANY, NORTH TRURO.

2. $15,000.

3. 1893.

4. 65,000 cubic feet.

5. Direct expansion.

6. We do not store for hire.

7. We store only fish we freeze, as cod, mackerel, whiting, herring and other food fish, and squid, etc., for bait.

8. Season of 1910 we froze 5,100 barrels of fish; about 5,000 were food fish, possibly less, and the balance bait; first frozen May 2, 1910, last shipped Feb. 26, 1911.

9. Ten months was the longest period this last season, but time should be made twelve months for fish and perhaps longer for bait.

10. The whiting caught in May were all sold and disposed of before they were getting them here the next spring.

11. A member of the local board of health is on the beach practically all the time our fish are being landed, as his business in other lines calls him there, and he is in and out of building frequently, and has made inspection even to freezing rooms, though in no way financially interested.

PROVINCETOWN COLD STORAGE COMPANY, PROVINCETOWN.

2. $15,000.

3. 1893.

4. 100,800 cubic feet.

5. Direct.

6. The business of this company is the buying, freezing and selling of fish. No goods of any description are stored for other parties.

7. Herring, squid, porgies, pollock, flounders, whiting, sand eels, shad, spurling. These refer to the dates mentioned in your inquiry, January to December, 1910.

8. 1,640,084 pounds, all fish.

9. Ten months.

10. None. All fish are sold before the close of the market year.

11. Occasionally.

G. STATEMENTS OF WITNESSES AT HEARINGS GIVEN BY COMMISSION.

1. Extracts from Testimony of Junius T. Auerbach, Esq., at Hearing, Nov. 1, 1911.

Mr. Chairman, and Gentlemen of the Commission, excluding His Excellency the Governor, and Mr. Murray, I suppose I had as much to do with the appointment of this commission as any man in the Commonwealth. I suppose I am responsible for all the agitation that has been raging in the Commonwealth; most of the things seen in the newspapers were written by me, and most of the things I have not written were inspired by me. I didn't intend to take any part in these hearings at all. I made all the struggle I could before the last legislative committee. The cold-storage men were too strong for me, and I was gloriously licked. The result of that licking and the defeat of my ideas was the appointment of this commission. But I have a keen sense of humor, and when I read of these love feasts going on up here day after day, in which the public were not represented and in which nobody took the side that there ought to be any regulation of the cold-storage business, I thought I would come up and say a few words. . . . When I saw evidence gravely submitted to this commission that it improved food and fish and fresh food to be put in storage warehouses and freezers and kept an indefinite length of time, my sense of humor was so titillated that I thought I would come up and say something. I say, — with all due respect to the commission, — I felt fairly well satisfied in my own mind as to the position and point of view and opinion of at least the majority of the commission. Feeling that I might have to fight the report next year in the Legislature, I thought I had better save my time and ammunition for that time.

Contrary to what people think, I am a conservative man and believe in things as they are. I am not at all radical. I believe in cold storage; I think it does a great deal of good; think that it is one of the best things, when rightly run, that has yet been discovered for the people. But what I wish this committee to report, and do not expect them to report, is something in the nature of regulation. It is not my idea that all storage warehouses should be burned to the ground, nor that every man in the cold-storage business should be hung by the neck until he is dead, — not anything of the sort; but some form of mild legislation should be put in force, and the Legislature should pass needed laws.

I have been practicing law in this building for a good many years, — I have represented a good many interests up here, — but never in all my experience have I seen any business submit to regulation sweetly and nicely, and admit that it was necessary, or that they could afford it, or that it was constitutional. So it didn't surprise me in any wise that all those things were claimed in the present case, — disregarding entirely the wishes and need of the people and the laws in other States. I listened with a straight face the other day to a good lawyer . . . who gravely told this commission that it was unconstitutional. And I will say that if you can find any lawyer of his rank who will tell you that it is unconstitutional for a Legislature to pass a law that food must remain only a certain length of time in cold-storage warehouses, or be stamped with the date of goods going in and the date of its withdrawal, I am willing to admit that I am wrong. You can't find any such man. . . . He was right only in one thing. He said that if the Legislature passed a law that food must remain in cold storage any specified length of time, and at the end of that time taken out and destroyed or ordered sold, it would be unconstitutional. As a matter of fact, no one is asking anything of the kind. Every one knows, and it has been held a thousand times, that the Commonwealth or the government can do anything that is for the social, financial or other well-being of the community, without recompensing anybody. Now, if this commission or the Legislature made a law that all food must be taken out and destroyed, even though fit for food, — I may not want to eat it and you may not, though still in a state fit for food, — it would be unconstitutional; but no one wants anything of the kind.

QUESTION. The Heyburn bill, so called, does propose exactly the thing you say nobody advocates; that is, food held in violation of the act, whch imposes a legal time limit, is subject to confiscation.

ANSWER. I think that is unconstitutional, assuming that the food is proper to be eaten.

QUESTION. The New Jersey act provides that food held beyond the time limit shall be inspected by the State Board of Health, and if it is found fit for consumption the owner shall be notified; in case of his failure to remove it within twenty days it is then to be sold at public auction.

Answer. I should think that was of doubtful constitutionality. I should assume that if the food was in fit condition to be eaten, it was unconstitutional, — but that goes a great way beyond what is necessary at all. . . .

You hear a great deal of this talk about "Massachusetts, there she stands," and about Massachusetts being in the lead for all beneficial legislation; I confess I am a great admirer of the Commonwealth, but I see none of that. I see a great lagging behind; so that even when other States have made beneficent regulations in relation to cold storage, it is almost impossible to get any action here at all. For instance, outside of Boston there is no inspection of any kind of cold-storage warehouses. What is the objection to having the State Board of Health, and any city or town board of health, at proper times make inspection of food that goes in and goes out of cold-storage warehouses? It must be necessary, for there is hardly a day that the national pure food people, for instance, haven't seized from the cold-storage warehouses broken eggs, which turned out to be rotten, for bakers' supplies; and only last week they seized a large shipment of horse meat intended for food in New Jersey. You may answer that those things are not true in Massachusetts, I don't know whether they are or not. If they are true, we ought to have some obligatory inspection; and if they are not true, then it can't do any harm of any description.

Now, I know — with all due respect to the specialists — that food which goes into cold-storage warehouses and stays there for a considerable length of time is not as good food as that which is unfrozen. In my own case, my first interest in cold storage came from a case of ptomaine poisoning. I might have got that from something else, but the specialists said I got it from cold-storage chicken. . . .

I may say, with all due respect to the Commission on High Cost of Living of last year, that there was only one thing that met with my approval, — they seemed to think that it wasn't right to have cold-storage food sold to the public in ignorance that it was cold-storage food. There is nothing now in the law that prevents that. The public ought to know whether an egg has been in storage a short time or a long time. There certainly ought to be a difference in the price. I don't want to pay as much for cold-storage goods as I do for stuff that comes off a farm. I don't believe anybody does. All the specialists in the world couldn't make me believe that there isn't some change in the fiber of the food after it is frozen. Certainly it deteriorates much more rapidly when it comes out than fresh food does. . . .

Now, here is a naive statement from the Cost of Living Commission of last year: "So far as the price of cold-storage products is concerned, it would seem that the individuals engaged in the business of food distribution could be trusted to take goods out of storage at the time best suited to the needs of the consuming public." Now, that is just exactly what they don't do, and just what you wouldn't expect them to do. They don't take them out of cold storage when the public wants them, but when the price meets with their approval, or the supplies are so low that they can get a higher price. It has got so now that the cold-storage business has grown entirely out of the original thing. For instance, they now become bankers; they lend large sums of money on goods put in there. It is naturally to their interest to get back their money that those goods should be marketed at the highest price they can get for them. . . . Certainly the speculation in foodstuffs would be very much less harmful than it is now if the law limited how long things should be kept in storage. . . .

What harm is there in stamping goods, except the small expense of a man to write the label and put it on? I am frank to say that I don't approve of that branch of regulation that tries to fix different times for different articles of food, because the climate is different in some places, the demands of the people are different, and the specialists themselves don't agree as to how long any particular article can be stored without hurt, but I see no objection to passing a wise and strong inspection law in Massachusetts. . . .

A very large proportion of the food which we buy and eat and think is fresh comes out of cold storage. I believe that ought to be inspected, regulated; the public should know what is fresh and what is frozen for a long time, and they should have in each particular place a right to know, and it is perfectly plain that has got to affect the price. . . .

Q. You believe in inspection?

A. I do.

Q. You believe in tagging the foods when they go in and out?

A. Yes.

Q. You also believe in a season time limit?

A. Well, I think I do believe in that, but I am not expert enough on that to say whether I believe in it or not. I should say a season time limit on butter and fruit was all right, but I shouldn't think a hard and fast limit on a thing like an apple was required. . . .

Q. You hold, in general, that the consumer has a right to know whether he is buying cold-storage or fresh food, and if cold-storage, how long it has been held in storage?

A. Absolutely. If this commission cannot make up its mind whether the public ought to know that, you cannot arrive at any conclusion which will be helpful in any way, because that is the ground-work of it all. . . .

Q. Are you still sure of your ground that the marking is of greater necessity than inspection?

A. I say the marking is much better than fixing a time limit for different articles of food. I think the inspection is the prime requisite; I think the inspection is most important; then I think next the marking. . . .

Q. You state that you have read certain reports on cold storage. What have you read on the subject of cold storage?

A. I will tell you. I had a considerable mass which they asked me to leave with the last committee, and I didn't get them back. There were reports of numerous arrests for bad food taken out of cold storage —

Q. Newspaper citations?

A. Yes; they said, to-day the federal commission did so and so. Whether those people were found guilty or not, I don't know. I had a collection of editorials taken from the papers of the United States. . . . I clipped many things out of the papers, the collapse of speculation, Senator Lodge's statement in Congress, the proceedings before the committee in Congress. I had the doings of one or two western State, — I think Minnesota. I had the bills of New York, New Jersey and Illinois, and proposed bills that had been defeated, and some statements in writing from counsel in those various States. So far as my having made any particular investigation, I am frank to say I haven't done it at all.

Q. Have you read the reports of the United States Department of Agriculture?

A. I wouldn't want to say I had.

Q. Have you read the two volumes of hearings before the United States Senate Committee on Manufactures?

A. I have had them, yes.

Q. Have you read the volume of hearings before the Committee on the District of Columbia?

A. No, there is a great deal I haven't read. I will confess to a great ignorance of many things.

Q. Your information has been derived from newspapers and editorial columns in the press?

A. I wouldn't want to go as far as that. What accentuated my opinion was editorials, but I have read some reports on it.

Q. If you were bringing a suit in court, would you rest your case on newspaper evidence? Wouldn't you need to inquire into the facts?

A. If I went down to Mr. Utley's warehouse I wouldn't know any more than I know now.

Q. How many warehouses have you inspected?

A. None. As I say, in many respects my examination has been not at all complete.

2. Extracts from Testimony of Prof. William T. Sedgwick, Massachusetts Institute of Technology, at Hearing, Oct. 24, 1911.

Mr. Chairman, and members of the commission, I am very glad of an opportunity to come before this commission, and to explain my opinions in regard to cold storage and its advantages and disadvantages, because I have been for a good many years studying things of this sort, and especially public health matters, and have naturally, in the course of my ordinary professional work, taken cognizance of all methods of food preservation, of which I consider cold storage to be one of the most important and beneficial to the human race. When we got the art of canning we made a great step forward in saving the surplus of one season and time up against the scarcity of another season and time, and when we got cold storage we made another important forward step, in my opinion almost equally, perhaps equally, as great. I don't suppose I need amplify that; everybody admits that the salvage of food, especially in these days of increasing costs and increasing population, is of fundamental importance.

Now, I have read in the newspapers and elsewhere various criticisms of cold storage, and especially along two lines; first, along the line of health, and secondly, along the line of costs. . . . So far as I am aware, there is no evidence whatever that cold storage is in any way prejudicial to the public health. On the contrary, it is one of the greatest aids to public health, in that it makes food more accessible and more abundant, and thus enables people to keep up their strength and to avoid such diseases as scurvy, from which the human race formerly suffered so intolerably. Various allegations, of course, have been made touching the wholesomeness of cold-storage materials, such as that deterioration takes place during cold storage, whereby people are poisoned or otherwise badly affected, but I have yet to hear of a single instance of carefully investigated and well-authenticated food poisoning due to the effects of cold storage, — to deterioration during proper cold storage. I have, myself, like everybody else, repeatedly consumed cold-storage materials, and while I am ready to admit that the flavor is sometimes changed, and not always for the better, I do not know of any well-authenticated, carefully investigated case of food poisoning, or other ill effects, due distinctly to cold storage.

In fact, I am so enthusiastic about cold storage, and what it is doing for mankind to-day, on land and on sea, in building up vital resistance and driving out the old disease of scurvy, making it possible to live in the woods, or the wilderness, or desert, or on shipboard for long periods without otherwise fresh food, that I wanted to come up here and simply express the opinion of a man who has given a good deal of attention to the subject, that instead of hampering cold-storage interests in any way we ought rather to favor them in every respect. This, first and foremost from the sanitary, public health point of view, but secondly, also, from the economic point of view.

If it were not that cold storage enables vast quantities of food, bought at a favorable time, to be held and sold during the period of scarcity, then the result would inevitably be that the next year the farmer, having found his prices very low this year, would go out of the production business to a greater or less extent, with the result that less food would be produced, and prices later would unquestionably rise. In other words, all sorts of food preservation, including cold storage, in my opinion tend to increase production, and increased production means more supply, more food for the people, and that, of course, is what we want.

Now, I know something about the cold-storage business, having been brought into contact with these questions through various investigations, and I do not myself believe that it is possible successfully to corner food products. Nor do I believe it necessary to put time limits on them, because nature has put in time limits of season, so that whoever undertakes to gamble in food products is gambling against nature. He may once in a while win, but I think he stands to lose much oftener than he does to win, and I think the history of such attempts would prove that.

As for the time limit, in my opinion that is both unnecessary and futile. It is unnecessary, because it will very seldom pay, if ever, to carry over the product of one season to another, since the accumulated charges of storage and insurance, interest and deterioration, will all roll up to meet the fresh article produced at the end of the season the next year; so that whoever undertakes to corner food, or gamble in food, — I mean, of course, the major foods, such as grain and butter, eggs and meats, — is playing a risky game, and I think facts could be brought forward to show that.

In my opinion, cold storage is one of the greatest benefits mankind has ever devised, one of the greatest safeguards against famine and plague and pestilence; and it is a perfectly legitimate business, with which it is not either necessary or wise greatly to interfere. I do feel that, like other public-service matters, it should be subject to public inspection and investigation. I think that the boards of health should have powers of entrance and examination, and should keep a general watch upon foods in cold storage, as they would, and should, and do upon foods in markets, or milk, or anything else. A reasonable and scientific inspection no man can object to, but as to imposing arbitrary time limits, I conceive that that would be a very serious and foolish matter.

Take, for example, the matter of eggs, — which I do know a good deal about in detail, — I should say that any such proposition as to limit storage to three months, for example, would be perfectly foolish. Six months would be equally foolish, because at the end of six months we are in the very period when the eggs are scarcest, and if it were not for cold storage and other methods, I believe eggs at Christmas time would be $2 or $3 a dozen; they are dear enough as it is. They would be very much dearer, if it were not for methods of storage and preservation. This country doesn't produce all the eggs that it needs; eggs are imported even in this agricultural country, particularly in this portion of the country, and it would therefore be very unwise to limit the time of storage of eggs, when no one can safely gamble against next year's egg crop. When the spring comes, and the hens begin to lay, eggs are very abundant and very cheap. By that time any storage eggs have accumulated against them all the interest charges and storage charges; they are not as fresh as they were, although they are perfectly good for food purposes. I have myself eaten cold-storage eggs a year old, and found them quite as good as eggs that had been stored a month or two months. And I have seen a woman expert on eggs open eggs of that kind and compare them with eggs that she had recently been buying at 50 cents and 60 cents a dozen; and she said that they were just as good, so far as she could see, as those which she had been buying.

Q. You say that cold-storage eggs a year old were found as good as eggs two months old? What do you mean by "good"?

A. I mean that as you break it out, it looks good, smells good, and when you cook it it tastes good.

Q. Do you think that the egg has not deteriorated in any way?

A. I don't think that it has deteriorated at all, — if it was a good egg to begin with, and cold-stored properly.

Q. Have you ever taken an egg from ordinary cold storage, under ordinary conditions, and tried it?

A. Yes, often, and I have been surprised to see how good it was. In fact, that's what we get most of the time along in February; those that are sold as fresh eggs are most of them storage eggs, perfectly good. If we couldn't get them in that way, we should find great difficulty in getting them at all at that time.

3. Statement submitted by Mr. Charles H. Utley, President of the Quincy Market Cold Storage and Warehouse Company.

It is desirable that all "perishable" foods which are produced should be consumed, and not wasted. In order to stimulate and make possible the production of the greatest quantity of such food which is beneficial to the consumer, the producer must be assured that the foods produced are to be used and not to be wasted. Eventually, the cost of all goods wasted has to be borne by the consumer. The fact that, according to the laws of nature, almost all human food is perishable, implies that if it is not to be wasted, some adequate means must be provided whereby this "perishability" shall be held in check for the greatest time consistent with the public health. No better means of preventing this waste of food is known at the present time than by the use of "cold storage," and this use accomplishes most desirable results, advantageous to both consumer and producer, by the conservation of food, which is just as desirable as the conservation of our natural resources.

Nearly all perishable foods are seasonal and have their time of flush and their time of scant production. Further, they are all subject to the vicissitudes of the seasons.

It follows that at the time of flush production the quantity produced is in excess of the demand for immediate consumption, and at the time of scant production the demand is in excess of the quantity produced at that time. Cold storage acts as a reservoir where what would otherwise be wasted is kept until it is needed, — thus making the supply more uniform, the average cost lower, and at the same time preventing extreme fluctuations in prices.

The agitation against cold-storage goods seems to rest upon very slim foundations. One gentleman very familiar with the entire subject says, "It all arose from a desire to make some one a 'goat.'"

It was necessary to find some explanation for the high cost of living, and to many people who knew nothing of the subject the cold storage of food seemed to fill the bill. Legislation to control and regulate cold storage was first suggested at a time when it appeared desirable, for political reasons, to divert public attention from other conditions and circumstances which were generally considered to have considerable effect on the cost of living.

A very elaborate and exhaustive compilation of statistics of the prices on butter and eggs, which are the principal articles placed in cold storage, was prepared and presented to the committee at Washington, which showed that during the seasons of scant production, prices on both butter and eggs were lower during the last ten years, when cold storage was generally used, than they were during a corresponding period before cold storage had been so generally adopted.

It is my firm belief that not only is the cold storage of food not in any way responsible for the high cost of living, but, on the contrary, has prevented prices from being higher. All the European countries have had a similar increase in prices, yet they have scarcely any cold-storage warehouses.

France, after careful examination of the subject, has taken action towards the establishment of cold-storage warehouses, — believing that by so doing prices of food will be reduced.

The agitation in connection with cold storage has, fortunately, resulted in bringing to public attention much real information, and in the consideration of the subject by intelligent writers, who have carefully investigated the subject. The findings of all such investigators have invariably been favorable to the cold-storage business, and have done much to correct previous wrong impressions. It is, however, recognized that there still remains in the minds of many a notion that there is some wrong somewhere in the business, and that it would be desirable to have some legislation on the subject. What legislation, if any, is desirable or necessary is the question that has been referred to this commission.

I think it is fair to assume that legislation could be recommended only after the disclosure of some existing conditions that were detrimental, —

First, to the public health, or

Second, to the general welfare of the community.

I submit that there have not been produced any substantial facts or evidence that justify further legislation.

Considering first the health feature, there has never been presented at any time any evidence to show a single instance of a case where a person has suffered any injury resulting from eating food which was injurious to his health simply because of the fact that such food had been placed or been kept in cold storage. The present laws providing for the inspection of cold storage, as well as of all food offered for sale, appear to give ample protection to the public.

The second reason for legislation, which concerns the economic feature of the subject, and which is supposed by some to have been the means by which prices on various commodities have been advanced, I can state emphatically and unequivocally to be untrue, so far as any advantage has been procured by combination or organization of individuals with the purpose of securing such results. This aspect of the case is well covered in the brief of Ex-Congressman Littlefield, who represented the cold-storage interests at the committee hearings in Washington, who states: —

"If it were true that cold storage has been or now is, a factor in artificially and unlawfully increasing the price of food products to the consumer, then existing legislation known as the Sherman anti-trust law is amply adequate to care for that phase of the question, and no reason is perceived why any parties who have been engaged in such a combination or conspiracy cannot be effectively and adequately punished therefor, and any further combination or conspiracy in that line adequately restrained."

The company which I represent does not own any of the goods which it stores. The goods are owned by about 3,000 different patrons, wholesale and retail dealers, restaurant and hotel keepers, and many who place goods there for their own individual use. There is no combination or organization which acts to control either the prices or the movement of goods. Each owner of goods acts according to his own individual and independent judgment.

Considering now the various methods which have been suggested in connection with proposed legislation: —

INSPECTION BY STATE AUTHORITIES.

While I believe that the federal pure food law and our State laws are quite adequate on this subject, and that our State and local boards of health have faithfully and efficiently carried out the duties imposed upon them, I favor such further inspection as may be deemed more effective in protecting the public. It will be undoubtedly admitted by all that the most desirable object to attain in the matter of inspection is to secure the most effective results possible at the least expense to the State. To formulate a method to obtain this desirable purpose is not a simple or easy matter. To actually examine every article that went into storage, necessitating the opening of thousands of packages in a single day, would be impossible without causing serious interference with the business and a great loss and damage to goods.

The examination of an occasional package in a lot would probably be all that would be required to obtain desired results, as most lots run uniform in quality. While such a course would be practical, it would require much labor, particularly if goods were to be again inspected on delivery. It is, of course, true that if goods are bad when they enter cold storage they are bad when delivered. It is also a fact that some goods which were good when put in cold storage may be bad when taken out. Such goods would be, for the most part, goods stored at high temperatures, and it would be fully as effective to have them inspected at the time of delivery. This would require less inspectors and much less expense. Any method that is adopted will necessarily be to a considerable extent experimental, and quite likely have to be changed to suit conditions as they develop.

It must be kept in mind in connection with the feature of inspection, as a means to protect the public health, that the nearer to the consumer the inspection is made, the greater the protection. The nearest point to the consumer where inspection can be made is the place where he buys his goods. Much could occur between the time when goods leave the warehouse and the time when they are delivered to the consumer.

There is one aspect connected with the matter of inspection to which I think it proper to call your attention, and concerning which I will make no comment. It is contained in the brief presented to the committee in Washington by Ex-Congressman Littlefield, and is as follows: —

"While the primal importance of an inspection of food products so as to insure their good condition when they enter cold storage is obvious, there is a vital economic fact that must not be lost sight of when legislation providing for inspection is being enacted, or when the authority for the making of rules and regulations is being conferred, and that is, that the inevitable tendency of legislation or regulation on a comprehensive scale, requiring such inspection, especially if it is drastic in its character, is to consolidate the handling of such products in the hands of a few great corporations and eliminate the independent producer and handler. It is, we understand, generally conceded that that operation of the inspection laws now in existence with reference to meats has been to consolidate or concentrate the business of handling meat in the hands of a few, and to destroy in a large degree effective competition. Our clients are independent producers and handlers of food products. They most vigorously and earnestly protest against any legislation or regulation requiring such a drastic inspection as will result in the placing of a club in the hands of great aggregations of capital, which will aid such aggregations in driving them out of business, and thus throttling the independent competition that now exists."

The Placing of a Limit of Time that Goods can be held in Cold Storage.

There would be no occasion for "cold storage," or the use of any other means for preserving food, if human food were not, to a greater or less extent, perishable. If it were not perishable it would, without doubt, be the practice of every individual to conserve a sufficient amount of such food as might be required or desired from a time when it was produced in the largest quantity, and when it could be obtained in its best and most desirable condition and at its lowest cost, until the time when it could not be easily produced, and when, because of its scarcity, its cost would be greatly increased.

The advisability and desirability of such a procedure would be so generally recognized and so universally adopted, that there would be no argument or objection to such a course, and no suggestion of a limit of time that such food could be held. If such a policy is conceded to be a proper and desirable one, although it is one which is, to a considerable extent, precluded by the fact that human food is perishable, then the introduction of some method by which such food can be prevented from perishing, so that the desired policy of conservation could be adopted, must be very desirable.

Logically, the only limit of time would be the limit of the capacity of the method employed to prevent the goods from perishing. This should regulate itself without any provision of law, because the necessary incidental cost of holding goods and the interests of owners would prevent their being held for any such length of time as would affect their food value, and, as a necessary sequence, their market value.

Every article which is placed in cold storage is merchandise, and is property of more or less value to its owner. The rights and privileges of the owner of this property should be the same as the rights and privileges of the owner of any property, and any curtailment of the owner's power or right or control over his property that might for any reason be considered as proper and desirable, in order to be logical, right and just, should be applicable to all property where the same or similar conditions and reasons apply with equal force.

In the case of property in cold storage, it is proposed that, after it is so held for some definite period of time, legislative enactment shall provide that it can no longer be held in such a place, or, if so held, shall be subject to condemnation. Such a provision of law, whatever the form it may be in, would practically mean great loss to the owner, because the property loses, in consequence of such a provision, a considerable part of, if not its entire, value. It can be demonstrated that there is no definite stated period of time beyond which articles become injurious, simply because they have been held that length of time in cold storage, or, on the other hand, that they are harmless and healthful simply because they have only been held for a length of time less than the period stated. It is a fact that there are many articles of food held in cold storage that could be held almost an unlimited time, and while their palatability might be affected, no change would occur to cause them to be injurious. It is also a fact that in the practical operation of the business comparatively few articles are held longer than from one season of production to the following season, so that if a time limit of twelve months were by law placed upon such articles, no very serious results would be felt by the owners of the goods, or by those operating cold-storage warehouses, but the enactment of any law having as one of its provisions a time limit is open to the following objections: —

First. — It is unreasonable, as the test of time is not a reliable standard to indicate either the quality or the condition of the goods.

Second. — It is illogical, because it imposes certain restrictions and regulations on goods held in cold storage, where they receive the best possible care and are under conditions best adapted to their preservation, without placing restrictions or regulations on the same goods held in ordinary storage, or when some other method of preservation, such as canning, is employed.

Third. — It is a bad principle to introduce into legislation, and one likely to be far-reaching in its further application. The principle involved is that of practically restricting or limiting the time during which an owner can retain control of his property. There can be no *logical* reason against the extension of this principle, after it has once been established, to all articles of merchandise, and to property of any kind. The fact that the time limit in the legislation proposed is placed upon the property classed as perishable food in no way affects the principle involved, if it should prove to be the fact that this property retains, at the expiration of the limit of time, its mercantile value, which, of course, would mean that it has not deteriorated in quality as food. There would be equally as good reason to limit the ownership of any agricultural or manufactured product, such as tea or wine, to a restricted time, as to place this restriction upon the ownership of articles held in cold storage.

Any legislation which is prompted by a desire to lessen the cost of various articles of food, which takes the form of restricting the time which such foods can be held, would not accomplish the desired and expected result, because it would have a tendency to restrict the production of such articles, and any curtailment of production must inevitably ultimately cause higher prices.

A time limit established by the State is virtually a guarantee that all goods held less than the time specified would be in perfectly good and wholesome condition, which, from one cause or another, would not be the case.

While considering the subject of time limit, I desire to call the attention of the commission to certain testimony given before the Committee on Manufactures at Washington. Dr. Pennington, who has spent the last five years on the question of cold storage, under the auspices of the Department of Agriculture, and is recognized as a better authority from both a scientific and practical standpoint than any other person in the country, stated that she had "no facts that would justify the limiting of cold storage to a period less than twelve months, provided the goods go into cold storage in proper condition," and that "no facts had developed that would justify or require a limit less than twelve months."

Senator Cummins asked Dr. Pennington this question: "So, as a whole, you think if we were eating altogether chickens that had been hard frozen for sixteen months, we would be eating better food than our forefathers and foremothers handled in the ordinary way; that is your conclusion, I take it?" To which Dr. Pennington replied: "If the poultry has been properly handled before it is hard frozen, and our entire supply should consist of such poultry, I think it would be better poultry than any we have been accustomed to heretofore, and better than most of what we have upon our markets at the present time."

Dr. Rogers, also of the Department of Agriculture, testified that his investigation did not disclose anything warranting a time limit less than twelve months.

The evidence of Dr. Pennington and Dr. Rogers of the Department of Agriculture was confirmed by other eminent scientists, including Dr. William J. Gies, professor of biological chemistry of Columbia University, and Dr. Herbert D. Pease, in charge of the bacteriological work of the Lederle Laboratories, New York.

The judgment of the men engaged in the business concurs with the opinion of scientists. Mr. Dowie gives an extremely significant illustration of the practical operation of cold storage in his experience. During the last few months the government had occasion to buy cold-storage poultry, and he showed to the inspectors, who are assumed to be men of intelligence, and certainly disinterested, at least not interested in the cold-storage industry, poultry that he had for sale which was called fresh, as distinguished from that afterwards selected by the inspectors, being the present season's packing or freezing. The inspectors were shown by another party poultry that had been frozen and held in cold storage sixteen months. The government inspectors examined each box, and accepted the sixteen-months cold-storage poultry in preference to that which had been stored eight months. Mr. Dowie said in his opinion these inspectors exercised good judgment, for the poultry which they chose was better goods. This is a practical demonstration that poultry can be stored at least sixteen months without deterioration or injury, if placed in cold storage in good condition.

Mr. Droste gives his practical experience with butter, which is along the same line and demonstrates similar conditions. It appears that a representative of the Navy Department, procuring butter for the Navy Department, was making contracts for anywhere from half a million to a million pounds of butter at a time, bought the butter at the best producing season of the year and arranged to have it kept in cold storage anywhere from eight to ten, twelve and fourteen months, at which time they use it in preference to the fresh product, which is on the market at the end of the storage period.

These two practical illustrations are distinctly corroborative of the opinion of the scientific witnesses, and furnish a complete demonstration that poultry and butter can be properly and safely kept from fourteen to sixteen months in cold storage. The scientific testimony and these practical experiences fully justify the opinion of the various witnesses when they say that the time limit, if any, should not be less than twelve months upon poultry, eggs, butter and fish.

I think it would be found to be an extremely difficult matter in framing to provide for the enforcement of any legislative act fixing a definite time limit that goods could be held, because if it can be shown at the end of the time fixed that the goods are wholesome and consequently merchantable, the owner cannot constitutionally be deprived of his property rights in these goods. I would suggest the submitting of this question to legal authority by your commission.

The Marking of Date of Arrival and Delivery from Warehouse.

We object to this for the following reasons: —

First. — It will necessitate additional expense.

Second. — We do not think the information given to the public would be of any great value.

It would often be misleading. If a buyer has any further interest in the article purchased other than which is indicated by its quality and condition, he would desire to know the date of production, not any date connected with time of storage.

If in the judgment of the commission it should be decided that it was desirable and of benefit to the public to compel warehouses to place date of arrival or date of delivery or both on goods stored, we suggest that this be limited to containers, as it would be impracticable to place such marks on each separate and individual article stored; also that it be not required upon fruit and vegetables, because neither the length of time that these articles are stored nor other existing conditions seem to demand such a provision.

The facilities offered through the establishment of cold-storage warehouses we believe to be one of the most desirable and beneficial features of our modern progressive time, and one which is absolutely necessary to meet successfully the requirement of the economic demands of our country. I believe a careful inquiry into the subject will lead one to an agreement with the statement of the Hon. James Wilson, Secretary of Agriculture, that "cold storage is a great blessing to humanity."

Another instance of perhaps a less serious but none the less instructive nature might be cited.

A few years ago, in a party of gentlemen at one of our clubs, the conversation turned upon the subject of cold-storage food, and one of the party, a gentleman known as somewhat of an epicure, stated that cold-storage poultry was not fit for food. Another member of the party, who had some knowledge of the subject, stated it as his opinion that the first gentleman did not know what he was talking about, and that he did not believe that the said gentleman could detect any difference between a cold-storage chicken and a fresh-killed one.

The only obvious way of settling this dispute was by a wager, which was promptly made between the two gentlemen. It was agreed that the first gentleman should purchase two fresh-killed chickens and the other gentleman should purchase two chickens which had been some months in cold storage. The chickens were to be delivered to a referee who should mark them so that they could be identified, should give them to the cook, and that all the party should meet at dinner and await results. None of the party, nor the cook, knew which were the fresh nor which were the cold-storage chickens.

Although the gentleman who had been so sure the cold-storage chickens were not fit to eat brought his own carving knife to the dinner, and carved and tasted each chicken himself, he was wholly unable to pick out the storage chickens, and lost his bet. In fact, he declared most positively that the first chicken which was brought on was fresh killed, and that no one could for a moment make any mistake about it. The referee declared that this chicken was a cold-storage chicken which had lain for months frozen stiff in a temperature of 10 degrees below zero in the rooms of the Quincy Market Cold Storage and Warehouse Company.

H. OFFICIAL REPORTS RELATING TO THE SUBJECT OF COLD STORAGE.

1. Report of the United States Secretary of Agriculture on Economic Results of Cold Storage.

The annual report of the United States Secretary of Agriculture, 1911, contains an extended discussion of the economic results of cold storage. The discussion is based on the results of a special investigation by the department made in September and October, 1911. The investigation was undertaken "because of lack of information with regard to the management of cold storage and in view of some criticisms of the business." The department sent out schedules to be filled out by warehousemen, showing the quantities of receipts and deliveries of fresh beef, mutton and pork, dressed poultry, butter, eggs and fish, for each month during a period of two years ending August, 1911. In connection with the schedule inquiry concerning the cold-storage business, experts of the Bureau of Statistics collected wholesale price quotations of the commodities included in the investigation for a period extending from October, 1880, to October, 1911. The results of the investigation are presented in the report as follows: —

> The principal months when fresh beef is placed in cold storage are September, October, and November; mutton, August, September, and October; butter, June, July, and August, and sometimes May; eggs, April, May, and June. Pork is quite well distributed throughout the year, and the prominence of winter in the receipts into cold storage is barely perceptible. Poultry is made up of diverse elements. Broilers go into storage early in the spring and roasters in the early autumn. There are besides the different varieties of poultry. November, December, and January are the heaviest storage months, and sometimes October.

With regard to fish, there seems to be no regularity in the heavy months; the three heaviest months in the year beginning with March, 1909, were August, November, and January, but in the following year the months were April, July, and December. The kinds of fish that go into cold storage are seasonable, and the natural supply does not last throughout the year. There are also often two storages for fish. In the initial one the fish is received fresh at the place where caught and kept a length of time determined by circumstances. This place is not usually one of consumption, so that in that event the fish is transferred frozen to cold storage at a place where it is to be consumed. In this investigation the two storages are added together in stating time of storage.

During the three heavier cold-storage months of 1910–11, 47 per cent of the fresh beef placed in cold storage during the whole year was received into the warehouses; 59.8 per cent of the fresh mutton; 59.2 per cent of the dressed poultry; 70 per cent of the butter; and 79.4 per cent of the eggs.

Delivery within Specified Number of Months.

"Delivery" is the word used in the business to indicate a taking out of storage, because the deposit is delivered back to the owner.

The New York cold-storage law of this year limits the storage of foods to 10 months, except that butter may remain for 12 months. The New Jersey law of this year fixes a limit of 10 months. The Heyburn bill assigns a limit of seven months to fresh beef, four months to veal, pork, and mutton, and three months to lamb, poultry, game, fish, eggs, and butter.

It is established by this investigation that 71.2 per cent of the fresh beef received into cold storage in the year 1909–10 was delivered within three months, 28.8 per cent of the fresh mutton, 95.2 per cent of the fresh pork, 75.7 per cent of the poultry, 40.2 per cent of the butter, 14.3 per cent of the eggs, and 35.5 per cent of the fish.

Within four months after it was received 86 per cent of the fresh beef was delivered, 42.7 per cent of the fresh mutton, 96.5 per cent of the fresh pork, 85.3 per cent of the poultry, 53.4 per cent of the butter, 22.6 per cent of the eggs, and 49.5 per cent of the fish.

The percentage of receipts delivered in seven months is 99 for fresh beef, 99.3 per cent for fresh mutton, 99.9 per cent for fresh pork, 96.1 per cent for poultry, 88.4 per cent for butter, 75.8 per cent for eggs, and 64.9 per cent for fish.

Lastly, let the percentages for the deliveries of 10 months be stated. These are represented by 99.7 per cent for fresh beef, 100 per cent for fresh mutton and pork, 98.9 per cent for poultry, 97.8 per cent for butter, 99.9 per cent for eggs, and 77.5 per cent for fish.

It is possible to parallel the above statement with one for the following year, 1910–11, for the deliveries of three and four months, but not for a longer time. The figures for three and four months are most of them considerably below those quoted for 1909–10.

The important observation to be made is that the receipts into cold storage are entirely or very nearly exhausted by the deliveries within 10 months.

PERCENTAGE OF RECEIPTS HELD LONGER THAN A YEAR.

So common is the belief that large quantities of food are held in cold storage for more than a year that it is worth while to learn what fraction of the receipts of the warehouses embraced in this investigation has been in storage longer than 12½ months. In March, 1909, poultry was placed in some of these warehouses; on September 1, 1911, 29½ months afterwards, not any remained. All of the other commodities covered by this investigation had been delivered. The same fact applies to the commodities received 28½ months before.

In one warehouse there was discovered some fresh mutton that had been in cold storage for 27½ months, and this was 10.2 per cent of the fresh-mutton receipts of all reporting warehouses for May, 1909. Of the receipts of butter in that month, 0.3 of 1 per cent remained September 1, 1911.

So, determining the percentages in a similar manner, it was found that 0.1 of 1 per cent of the receipts of poultry for a month was still in cold storage at the end of 26½ months and 0.3 of 1 per cent in the case of butter.

For a storage of 21½ months, fresh mutton is represented by 0.8 of 1 per cent and poultry by 0.4 of 1 per cent. Poultry has 0.1 of 1 per cent for 19½ months, 0.2 of 1 per cent for 18½ months, 0.1 of 1 per cent for 17½ months, less than 0.05 of 1 per cent for 16½ months. For 16½ months butter has 0.5 of 1 per cent and for 15½ months 3.3 per cent, while mutton for the last period has 0.5 of 1 per cent.

For 14½ months in cold storage, 0.1 of 1 per cent stands for fresh mutton, less than 0.05 of 1 per cent for poultry, 3.5 per cent for butter, and 0.1 of 1 per cent for fish.

Fresh beef had 0.1 of 1 per cent still in cold storage at the end of 13½ months; fresh mutton, 2.2 per cent; fresh pork, less than 0.05 of 1 per cent; poultry, 1.3 per cent; butter, 6.6 per cent; and fish, 10.5 per cent.

At the end of 12½ months fresh beef had 0.5 of 1 per cent in storage; fresh mutton, 0.6 of 1 per cent; fresh pork, less than 0.05 of 1 per cent; poultry, 0.2 of 1 per cent; butter, 6.5 per cent; and fish, 13 per cent.

This statement covers all of these commodities held in cold storage longer than 12½ months. Warehousemen explain excessively long storages by stating that they are caused by lawsuits and other circumstances of an uncommercial nature.

AVERAGE LENGTH OF STORAGE.

Since the receipts and deliveries were reported by warehousemen for each month, it is easy to compute the average time of storage. The fresh beef received into storage during the year beginning with May, 1909, was kept there on the average for 2.3 months; the fresh mutton, 4.4 months; the fresh pork, 0.9 of 1 month; and the butter, 4.4 months. The poultry received during the year beginning with March, 1909, was kept on the average 2.4 months; the eggs, 5.9 months; and the fish, 6.7 months.

The average time of storage differs as between the first and the second half of the year adopted for the purposes of this investigation. The average time for fresh beef in the first half of the year is 2.6 months, in the second half 1.8 months; fresh mutton in the first half 4.8 months, in the second half 3 months; fresh pork in the first half 0.8 of 1 month, in the second half 1 month; poultry in the first half 2.6 months, in the second half 2.4 months; butter in the first half 4.5 months, in the second half 4 months; eggs in the first half 6.1 months, in the second half 1.7 months; fish in the first half 6.8 months, in the second half 6.7 months.

COSTS OF STORAGE.

STORAGE CHARGE, INTEREST, AND INSURANCE.

In the foregoing treatment of the information obtained with respect to the length of time commodities are held in cold storage, the subject has been examined from several viewpoints. It is apparent that long storage is exceptional.

The costs of cold storage are running against the prices of the commodities month by month. The owners must use good judgment and take their goods out of storage before the costs of storage, added to the original cost of the goods and some profit, will raise the total amount of cost above the market price. It is a problem of the future. Sometimes the owner of the goods errs in judgment and fails to make a profit, again he fails to get back the cost of goods and the costs of storage, and yet again he gets back all costs and a large rate of profit.

The warehouseman has a rate of charge for space for each commodity, in same cases for storing for the "season," and in others by the month. Another cost of storage is interest, which is not always a theoretical cost, because the owners of the commodities often borrow money on the security of their warehouse receipts. A third cost is insurance.

If these three costs are combined they amount of 0.437 of 1 cent per pound of fresh beef per month, or 3.5 per cent of the mean wholesale price of beef from September to November, 1910, the latest period of heavy warehouse receipts within the period covered by this investigation; for fresh mutton the costs are 0.352 of 1 cent per pound, or 3.8 per cent of the mean wholesale price in the heavy storage months, August to October, 1910; for fresh pork, 0.398 of 1 cent per pound, or 3.7 per cent of the mean wholesale price of January and February, 1911; for poultry, 0.446 of 1 cent per pound, or 2.8 per cent of the mean wholesale price of the largest class of poultry during October, 1910, to January, 1911; for butter, 0.571 of 1 cent per pound, or 2.4 per cent of the mean wholesale price of butter during June to August, 1911; and for eggs, the costs amount to 0.593 of 1 cent per dozen, or 3 per cent of the mean wholesale price of eggs, April to June, 1910.

The wholesale prices adopted for these commodities are the means of a few cities in all parts of the country.

It is evident that as the time of storage lengthens the cost and their percentage of the wholesale price must be multiplied by the number of months. If the storage is for 15 months, for instance, the cost per pound ranges from 5.273 cents for fresh mutton to 8.572 cents for butter, and is 8.898 cents per dozen for eggs; the costs for 15 months range from 36.5 per cent of the wholesale price in the case of butter to 57.5 per cent in the case of fresh mutton.

For the average length of time in cold storage, as ascertained in this investigation, the actual costs are: For fresh beef, 0.997 of 1 cent per pound; fresh mutton, 1.564 cents per pound; fresh pork, 0.350 of 1 cent per pound; for poultry, 1.079 cents per pound; for butter, 2.532 cents per pound; for eggs, 3.505 cents a dozen.

The costs of storage for the average length of time are 7.9 per cent of the wholesale price for fresh beef; 17.1 per cent for fresh mutton; 3.2 per cent for fresh pork; 6.8 per cent for poultry; 10.8 per cent for butter, and 18 per cent for eggs.

Approximately the wholesale prices of the commodities mentioned are increased by cold storage to the extent of the percentages just given.

Changes in Consumption caused by Cold Storage.

Before the advent of cold storage there was a relative monthly consumption of commodities, such as the foods now stored, throughout the year which was adapted to the current supply, and that supply was more or less closely related in time to the production.

Cold storage has interposed to change considerably the relative monthly consumption and to make it more even throughout the year. To illustrate with a supposition, if 1 per cent of the total amount of eggs consumed in a whole year were consumed in December before the day of cold storage, perhaps 3 per cent is the figure for the present time.

There has also been a change in relative monthly prices, due to cold storage. In the case of eggs the relative price has increased in the season of natural plenty and diminished in the period of natural scarcity.

These two facts, the changes in the relative monthly consumption and prices upon passing to the cold-storage period, have been arithmetically related to each other for eggs and butter to discover the effect on the mean price for the year. It is not an undertaking that can be worked out with precision and can be only indicative.

The results are that in the cases of both butter and eggs the annual price level has been raised by cold storage, for a reason apart from the costs.

In two ways, then, cold storage has raised the cost of living.

TENDENCY TO UNIFORMITY OF PRICES THROUGHOUT THE YEAR.

THIS RESULT NOT ALWAYS INDICATED.

The prices of commodities compiled for use in this investigation begin with October, 1880, and end with October, 1911, a period of 30 years. It is the opinion of men who are well informed that at about 1893 the quantities of the commodities covered by this investigation that were placed in cold storage were large enough relative to the total supply to have perceptible influence on prices. For this reason the prices, which are the first quoted ones for each month, are reduced to a mean for the period beginning with October, 1880, and ending with October, 1893. In this period are found conditions as they existed before the advent of cold storage.

The cold-storage period is subdivided in order that the prices of the later years may be observed. The second period adopted extends from October, 1893, to October, 1902, and the third one from October, 1902, to October, 1911. The prices of each period have been reduced to a mean for each month, as in the case of the first period.

The next step is the conversion of the mean price of the first of each month for each group of years into a percentage of the mean for the year. This gives index numbers that very much facilitate an understanding of the subject.

It is evident, if the percentages, or index numbers, are 100 for all months, that there is complete uniformity of prices throughout the year. Therefore a tendency toward uniformity of prices is a tendency toward 100, whether the index number is above or below 100.

In comparing the first period with the last it appears that there was a tendency toward uniformity of prices in the case of butter in 11 out of the 13 months, or much more than half; in the case of eggs and fresh mutton in 9 months; poultry, 8 months. Less than half of the months exhibit this tendency in the cases of the other commodities — 5 months for fresh pork and 3 months for beef.

If the second and third periods are compared, it appears that under the régime of cold storage there has been a tendency toward uniformity of prices for butter, eggs, and fresh mutton; away from uniformity for fresh beef and fresh pork; and no change for poultry.

Another aspect of the matter may be had by noting the range of prices for the three periods.

For butter the difference between the highest and lowest index numbers is 43.3 for the first period, 29.4 for the second, and 24.1 for the third. An approach toward uniformity is apparent, because the range between highest and lowest prices diminishes.

In the case of eggs the range of prices increases from 72.3 for the first period to 74.6 for the second, but declines to 63.4 for the third.

An unbroken tendency toward uniformity appears in the case of poultry, since the range between highest and lowest prices diminishes from 28.9 for the first period to 23.5 for the second and to 15.9 for the third.

Both fresh beef and fresh pork seem to have been subject to less uniformity of prices in the third period than in the first, as indicated by increasing range between highest and lowest. The range for beef rose from 8.2 in the first period to 9.4 in the second and to 14.3 in the third.

The range for pork fell from 14.4 in the first period to 14 in the second, but rose above the first to 16.7 in the third.

The foregoing examination of range of prices substantially indorses the other process in pronouncing in favor of a tendency toward uniformity of prices with regard to butter, eggs, poultry, and fresh mutton, and of a tendency away from uniformity with regard to fresh beef and fresh pork.

SPECULATION.

EVIDENCE THAT IT SOMETIMES EXISTS.

An examination of the record of the prices of commodities prepared for this investigation gives a suspicion that there has been much speculation in some years by the men who keep them in cold storage. One illustration may be given. The egg year 1910–11 had 29 per cent more eggs in cold storage than the preceding year, and yet the price index number went much higher in the months when it is high — October to January — and much lower in the months when it is low — March to July following.

At a time when there was a plenty of eggs in storage the wholesale price of eggs soared to 43 cents in Boston in November and December and to 45½ cents in New York for near-by State eggs. There was an apparent mistake of the storage men in overestimating the consumption of the public at exorbitant prices, because so large was the unsold quantity at the beginning of the next egg year in the spring of 1911 that the wholesale price of eggs fell in April to 18½ cents in Boston and New York, and the storage men dumped on the foreign market the greatest quantity of eggs ever exported from this country in a year.

STORED GOODS AS A PERCENTAGE OF CONSUMPTION.

LARGE ENOUGH TO BE OF PUBLIC CONCERN.

This business of storing foods has grown to such proportions that consumers have a rightful concern with its management for economic as well as sanitary reasons. From the returns made to this department by the cold-storage warehousemen, it is inferable that the fresh beef, fresh mutton, fresh pork, poultry, butter, eggs, and fish received into cold storage in a year amounts to a weight of at least 1,000,000,000 pounds and very likely to a quarter of a billion more.

The eggs received into storage in a year are approximately 13½ per cent of the farm production; the fresh beef is over 3 per cent of the census commercial slaughter of cattle; mutton over 4 per cent of that slaughter of sheep and lambs; fresh pork 11½ per cent of that slaughter of hogs; and butter 25 per cent of the creamery production.

RECOMMENDATION.

PUBLICITY.

This is no indictment of the men who keep foods in cold storage, except in so far as they sometimes speculate, nor need they be indicted for offenses in order that the public economic interest in their business may be made to appear. The foregoing matter, it may be supposed, establishes that. The man who places food in cold storage is somewhat in the situation of the man who forestalls the market. He may not attempt to do so, but the power may be a temptation.

The affairs of such a business as this should have publicity. The public ought to know how much goods are in storage from month to month and what the movements of receipts and deliveries are.

The food warehousemen should be required to send to Washington monthly reports containing the desired information. Here these reports could be promptly aggregated and the results could be given to the public on a previously announced day of the month, somewhat as the crop reports are.

2. Findings of the Massachusetts Commission on the Cost of Living, 1910, on the Subject of Cold Storage.

This commission considered the subject of cold storage of food products in relation to the increase of the cost of living, the causes of which it was instructed to investigate. The discussion of cold storage covers fourteen pages in the report of the commission.

In general, the commission's findings were favorable to the cold-storage interests as against the charges commonly brought against the business. The commission declared: "Impartial inquiry into the methods of cold storage leads to the conclusion that the general principle is sound and beneficent." Much of the popular clamor about cold storage, the report stated, must be set down to ignorance and hysteria. The cold-storage process was characterized as simply the application on a larger scale of the principle of food preservation used in the cellars on the farm and the ice chest at home. This principle is "the storing of food in time of plenty for its later use in time of scarcity." The cold-storage establishments, the commission asserted, are performing a useful and legitimate function in the distribution of food products.

As to the effect of cold storage on prices, the report stated that cold storage tends to make them steadier, preventing extreme fluctuations, either upward or downward. "The supply is reduced by the storing of products in the time of plenty, and the price consequently does not fall so low. The supply is increased by the marketing of storage products in time of scarcity, and the price consequently does not rise so high." Furthermore, it was pointed out that cold storage increases the production and thus helps to lower the price of certain commodities by extending the period over which perishable products can be marketed, and thus stimulating a larger volume of production.

As to the effect of cold storage on quality of foods, the commission declared that it is difficult to make precise statements. "Undoubtedly," the report stated, "there takes place a change of flavor as the result of cold storage, but if the goods are properly handled there seems to be no serious danger to health." The report quoted the results of various expert investigations concerning the effect of cold storage on foods, and remarks concerning these studies: "These investigations are only partial and have not settled conclusively the important questions arising in connection with the effects of cold storage upon quality of food products and upon public health. For definite answers to these questions one must wait until investigations now in progress under the direction of the United States Department of Agriculture have been completed."

With respect to proposals of legislation for the regulation of cold storage, the commission rejected the time limit as objectionable, and the branding or labeling scheme as impracticable. The commission also disapproved of the suggestion that the operations of cold-storage companies be restricted to purely warehouse business, remarking that the proposed restriction seemed needless, since it was not the general practice in cold-storage companies to buy and sell goods, and that in any event it would be useless, since the cold-storage companies would evade it with the greatest ease by arranging for the purchase and sale of goods through some outside firm.

The commission recommended as practicable and desirable measures of regulation in this field: —

1. Compulsory inspection of cold-storage plants by local health authorities.

2. Protection of purchasers against misrepresentation of goods by a law prohibiting, under penalty, the sale of cold-storage products as fresh goods.

3. Establishment of a system of federal inspection of cold-storage warehouses.

The reasons for rejecting the time limit and the branding or labeling proposals were stated in the report as follows: —

> This proposal of a fixed time limit for holding food products in cold storage is open to objections. No arbitrary limit could be set which would apply satisfactorily to all varieties of food, because the period during which they could be kept in satisfactory condition by cold storage varies greatly. The period of six months would be too short in the case of eggs, and would prevent holding eggs over the interval between the period of abundance, which ends with the month of May, and the period of scarcity, which begins in November. A period of one year would not interfere seriously with the legitimate features of cold-storage business; but, on the other hand, it would have no appreciable effect for good. In general, the business interest of dealers who place goods in cold storage

may be depended upon to adjust the period of storage to the requirements of the consuming public. Nothing whatever is to be gained by holding goods in storage for an undue period, until the goods become spoiled. So far as the price of cold-storage products is concerned, it would seem that the individuals engaged in the business of food distribution could be trusted to take goods out of storage at the time best suited to the needs of the consuming public. So far as the health question is concerned, any menace through the holding of goods for undue periods could be met by a system of inspection.

The scheme of branding cold-storage products appears to be entirely impracticable. This plan is embodied in the second section of the Senate bill, which provides that articles of food held in cold storage shall bear a label plainly stating the period of time during which the article has been held in cold storage. Its difficulties are conspicuously evident in the case of eggs. It would be possible, of course, to brand the cases of eggs with the date of entry and removal, although even this would entail considerable expense. But the eggs when taken from storage are usually handled and assorted by the jobber or retailer. It is hard to see how the identity of each separate lot of eggs could be preserved during this process. If the eggs were not handled at all, and were sold in the original packages to the retailer, still the customer would not be able to identify a cold-storage egg, or know the time of storage, unless each egg were branded upon receipt into storage and upon withdrawal. It would require an enormous force of markers and branders to do this. Similar difficulties arise in the case of meat, which is stored in bulk and later cut in small portions for sale to consumers. In any event, the necessity of branding would add greatly to the expense of handling products in cold storage, and must result in increased price of food to the consumer. It may be noted that Mayor Gaynor of New York recently vetoed, on the ground of constitutional and practical objections, a "tagging" ordinance passed by the board of aldermen.

3. Findings of the Senate Committee on Wages and Prices of Commodities, 61st Congress, 1910, on the Subject of Cold Storage.

The committee enumerated cold storage among the many causes contributing to the advance of prices. The catalogue of such causes, as given in the final report of the committee, was as follows:[1] —

Increased cost of production of farm products by reason of higher land values and higher wages.

Increased demand for farm products and food.

Shifting of population from food-producing to food-consuming occupations and localities.

Immigration to food-consuming localities.

Reduced fertility of land, resulting in lower average production or in increased expenditures for fertilization.

Increased banking facilities in agricultural localities which enable farmers to hold their crops and market to the best advantage. This results in steadying prices, but also tends to advance prices.

Reduced supply convenient to transportation facilities of such commodities as timber.

Cold-storage plants which result in preventing extreme fluctuations of prices of certain commodities with the seasons, but, by enabling the wholesalers to buy and sell at the best possible advantage, tend to advance prices.

Increased cost of distribution.

Industrial combinations.

Organizations of producers or of dealers.

Advertising.

Increased money supply.

Overcapitalization.

Higher standard of living.

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[1] "Report of Investigation relative to Wages and Prices of Commodities," Vol. 1, pp. 11, 12.

The majority of the committee agreed upon the following statement with respect to the effect of cold storage on prices:[1] —

> Cold-storage plants have tended to level prices, although they have enabled the dealers to take the best possible advantage of conditions both in purchasing when prices are low and in selling when prices are high.
>
> In March, April, May and June, when eggs are plentiful, they are purchased and placed in cold storage, and then sold to the consumer during the late fall and winter months, when prices are at their highest. This has resulted in increasing the demand for eggs during the spring months and a consequent higher price to the consumer. The eggs are withdrawn from cold storage for consumption when the supply of new-laid eggs is at its lowest. The eggs from cold storage may be sold to the retail dealers as "cold-storage" eggs, but the dealers and consumers agree that practically no eggs are sold under that description to the consumer. Storage eggs may be just as wholesome as are fresh eggs, but the consumer is convinced that they are not as palatable, and he believes he is entitled to know whether he is purchasing fresh or stored articles.
>
> Eggs have shown a greater advance since 1900 than has any other article of food. This is probably due largely to supply and demand, but also in part to the fact that the cold storage has artificially forced up the price.
>
> The committee recommended to Congress a bill limiting the time food products may be kept in cold storage. The bill is now being considered by the Committee on Manufactures.
>
> Cold-storage plants should at all times be open to the inspection of proper health or sanitary officers in order to insure sanitary conditions.
>
> Owners and others financially interested in cold storage were not called before the committee for the reason that the subject was being investigated by a grand jury.

The minority members of the committee, three in number, expressed themselves on the subject of cold storage as follows:[2] —

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[1] "Report of Investigation relative to Wages and Prices of Commodities," Vol. 1, pp. 124, 125.

[2] *Ibid.*, pp. 148, 149.

The majority seem to think that these plants are useful in preventing extreme fluctuations but tend to the greatest advantage to wholesale merchants. We believe that they are useful and of decided economic value in preventing loss of perishable stuffs and the saving of the surplus for future use, but we do not think that any evidence has been submitted to us to show that the wholesalers are the principal beneficiaries. We agreed with the majority sometime since in reporting to the Senate a recommendation for legislation fixing a time in which commodities should be held in cold storage. Our information is that the large packers have invaded this territory and buy up large quantities of eggs, chickens, fruits and vegetables at low prices, and hold them from the market for a large profit, so that the people never enjoy low prices. We prefer to have fluctuations, if the fluctuations were sometimes toward lower prices, than to have high prices all the time. We believe that no foodstuffs should be allowed to remain longer than one year in storage, if so long, so that each year should be required to settle its own account with its crop and production and the markets.

4. Findings of the Joint Select Committee of the 78th General Assembly of the State of Ohio, appointed to inquire into the Purchase, Storage, Sale of and Traffic in Food Products, Commodities and Supplies, 1910, on the Subject of Cold Storage.

This committee dealt with the subject of cold storage only in relation to the advance of prices, and gave no consideration to the question in its bearing on quality and palatability of products.

The committee recognized the importance and utility of cold storage as a factor in the distribution of the food supply. The report stated: "Americans have perfected such a marvelous system, surpassing even the most improved methods used in production, that food should be distributed at a minimum cost, and with less waste than in any other time in history." The food-storage system, the report stated, further, stands next in importance here to the transportation system. "The transportation and storage of perishable foodstuffs have been developed to a degree undreamt of years ago. The use of refrigerator cars and steamers, cold-storage plants and artificial ice results in such a saving of food supplies that it is exciting the wonder of the world."

In the summary of the causes of the advance in prices of food products, the committee remarked that "storage, refrigeration and speculation, the packer, the exporter and price maker, are the principal conditions and causes responsible for the high food prices."

Among the recommendations of the commission is found the following with reference to storage: —

> Storage is a blessing, but it has been subjected to so many abuses that the government should regulate it to promote sanitation and prevent food monopoly.
>
> The State should undertake the inspection of all storage plants, and the destruction of all food unfit for human consumption.
>
> The national government should regulate storage in order to reduce the evils of monopoly to a minimum.
>
> Price making as undertaken by trusts, federated associations or local boards like that at Elgin should be regulated by the national and State governments.
>
> Storage is doing for food what banking has done for money, and the standardizing of prices is thus made possible. Governments have fixed the limit for interest on money, and with the progress of food storage and price making they should investigate the propriety of fixing the profits on food.

These findings and recommendations are very indefinite and inconclusive, — in keeping with the general character of this report. The Ohio committee, in fact, merely scratched the surface of the problem of advancing prices, and made no thorough investigation of any single factor in the increasing cost of living.

5. Extract from Report of Subcommittee on Law and Legislation of the Washington Chamber of Commerce, 1910, and Resolution relating to Cold Storage.

While the effect of the introduction of cold storage in the preservation of food products is, in the opinion of the committee, only incidentally of importance so far as its influence on prices has been apparent in the hearings, this method of collecting produce of all kinds during the plentiful seasons and storing them for distribution during seasons of scarcity has been the subject of a wide range of discussion, first as to the healthfulness of products after undergoing a protracted period of storage, and secondly as to its effects on the market prices of the products stored. The testimony adduced before the committee has borne out the statement that the cold storage of articles for reasonable periods of time is not prejudicial to their food value, but that if the article be carried in storage for unreasonable or indefinite periods of time, and then released for sale, the effect upon the consumer is deleterious. There should, in the judgment of the committee, be remedial legislation by Congress regulating the storage of food products, — either by providing for conspicuously imprinting the date upon the individual article stored, or by some other practical method, and prescribing fixed allowable periods of storage. Companies should also possibly be specifically restricted to warehousing, thus prohibiting a proprietary interest by the company or its owners in the articles stored. It has transpired in the hearings of the committee that the effect of the maintenance of cold-storage plants in all of the larger commercial centers has been to slightly increase the market price, both wholesale and retail, of products during the plentiful seasons, and to decidedly reduce what would otherwise be the wholesale and retail prices of the same articles during the periods of scarcity. The charges fixed by our public cold-storage plants are, it would appear, reasonable compared with the rates demanded by similar, though much more extensive, plants in New York, Chicago and other large depots of food supplies, where there is more or less competition in rates. Aside from the baneful effect of rendering unpalatable and deleterious, as has been stated, articles stored for unreasonable periods of time, there would appear to be a positive benefit to the public generally in the operation of cold-storage plants, except as they may possibly be utilized by large combinations to facilitate the cornering of the market on certain classes of food supplies and compelling extortionate prices from the consumer.

Resolved, That in the judgment of the Chamber, remedial legislation should be enacted by Congress regulating the cold storage of food products, limiting the period of storage of particular classes of articles, and possibly restricting the operations of cold-storage companies to a purely warehousing business.

6. Statement concerning Cold Storage in Report of the United States Industrial Commission, 1901.

This report dealt with cold storage as a distributing factor rather from the point of view of the farmers' and producers' interests than from that of the consumer. The importance of cold storage was recognized by the commission. "The cold-storage system," the report stated, "operates as a balance wheel in regulating prices. In the summer it keeps up prices paid to producers; in the winter it keeps down prices paid by consumers."

One benefit of cold storage was especially emphasized, namely, its utility in enabling larger orders to be filled at short notice, as in case of ocean-going steamers. The report stated in this connection: —

> Another aspect of cold storage is here to be noted as affecting the distribution of eggs. By no other system could those vast stocks of eggs be maintained which have to be on hand to meet foreign orders that must be filled at short notice to go by steamers, within, say, forty-eight or seventy-two hours. Readiness to fill large orders quickly has been a factor in making our reputation as a bridge-building and locomotive-making people. Likewise the readiness to meet large demands for farm products of any kind must be made the test of our distributive system. We are only beginning to learn this, and when we learn it we may be able to get more of the immense trade in eggs as well as of poultry, for instance, with Great Britain.[1]

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[1] "Report on the Distribution of Farm Products," Vol. VI of Reports of United States Industrial Commission, pp. 297–306.

7. Extract from London County Council Report on Ice and Cold Storage, 1904.

Shirley F. Murphy, medical officer of health, in submitting the report, said: —

> Apart altogether from the desirability of the inspection of such premises with a view to seizure of unsound food, there has to be considered the need of securing that questions of structure and arrangement which are of importance for ensuring freedom of foodstuffs from contamination should be duly considered in designing cold stores. If this is to be successfully accomplished, it would necessitate the compulsory registration of all premises of this sort with the requirement that before being used the plans should be approved by a health authority.

Dr. W. H. Hamer, assistant medical officer of health, who prepared the report, stated in conclusion: —

> It is obvious, however, that what is needed in the interests of public health is not merely that any unsound food in a cold store should be seized and destroyed, but that consideration should be given, in originally designing refrigerating premises, to questions of structure and arrangement having importance in relation to health, and in order to attain this object it will probably be found necessary in the near future to require registration of all such places. The possibilities of mischief in the case of a cold store are possibly greater than they are in that of a dairy, yet the latter is subject to control by the health authority, while the former is not.
>
> It may be added that an amendment was recently inserted in the agriculture appropriation bill in the United States Congress "providing for a fund to defray the cost of investigation into the effect of cold storage on perishable foodstuffs, as to the effect of their nutritive qualities, or their liability to cause diseases," and it is stated (Cold Storage, May, 1904) that at the present time the American government is spending money upon investigations in refrigeration at Chicago.

I. RESOLUTIONS ON THE SUBJECT OF COLD STORAGE.

1. National Poultry, Butter and Egg Association, at Annual Meeting, Chicago, Oct. 23, 24, 1911.

Whereas, The question of the national and state legislation of the cold storage business is before the public and is receiving the attention of Congress, the several state legislature and municipal bodies, and

Whereas, The National Poultry, Butter and Egg Association assembled in the city of Chicago, October 23 and 24, desires to reaffirm its position taken at the last annual convention to the effect that the Association heartily favors such legislation as may be adopted in the interests of the public welfare which is based upon sound economic principles and complete scientific research work, and

Whereas, This Association desires to emphatically record its conviction that cold storage facilities are an economic necessity resulting in lower average prices for food stuffs, and increases the total available food products of the country,

Therefore, Be it Resolved, That this Association expresses its approval of the following principles of regulations and supervision:

First: Legislation and regulation covering the handling of food products before entry into cold storage and subsequent thereto, based on the results of definite experimentation by the United States Department of Agriculture;

Second: Supervisory inspection of foods before entry into cold storage, and if desired during the storage period;

Third: Publicity of holdings in public and private warehouses, indicating the stocks on hand at stated periods, and the movements of the same;

Fourth: Impartation of information to the consumer concerning the history of food products offered for sale, if that can be practically and uniformly accomplished.

Fifth: We do not believe a time limit is a necessary provision of legislation because scientific research work thus far done does not indicate any necessity for such provision, and because of the fact that the condition of the products would be properly controlled if regulations for the handling and inspection of foods were adopted. If, however, the demand for a time limit should be insistent, it should be for not less than a period of twelve (12) months, with privilege of extension upon examination on certain products;

Sixth: *Resolved,* That the Secretary be requested to forward a copy of these resolutions to such committees of National, State and City Legislative bodies as may have before them bills touching the cold storage question.

2. American Warehousemen's Association, at Annual Meeting, Chicago, Dec. 6 to 8, 1911.

Whereas, The subject of the regulation of cold storage and cold-storage products is now pending before Congress, and

Whereas, Hearings were held by the Committee on Manufactures in the United States Senate during the Sixty-second Congress on "Foods Held in Cold Storage," and

Whereas, Testimony was introduced by the Joint Committee Representing Storage Warehousemen and Affiliated Industries, reported in the published record of the above hearings, pages 42 to 208 and pages 424 to 435, therefore be it

Resolved, That the members of the cold-storage section of the American Warehousemen's Association assembled in Chicago, Illinois, December 8, 1911, on behalf of themselves, and their patrons who are storers of perishable food stuffs, respectfully urges that no legislation be enacted containing provisions similar to those appearing in Bill S 136, Sixty-second Congress, first session, introduced by Senator Heyburn, to which well-founded objections were disclosed by the facts presented in the above mentioned testimony.

Resolved, That we favor such regulation in the interest of the public welfare as is based upon the scientific research work of the experts of the United States Department of Agriculture, brought out in above hearings, as well as the scientific, practical and economic testimony which was also introduced.

Resolved, That we approve and commend the results of the investigation of Secretary Wilson showing the actual time food products are carried in cold storage, thus correcting popular misconceptions of the matter, and we heartily favor, as this Association has done before at several meetings, the recommendation of the Secretary in his annual report for 1911, that public and private cold-storage warehousemen be required to report the amount of foods in cold storage from month to month to the Department of Agriculture, and that publicity be given to such holdings.

Resolved, That we re-affirm the position taken one year ago by this Association in favor of the principles of supervisory inspection of foods entering cold storage and the giving of information to the consumer concerning the history of cold storage food products offered for sale, provided that can be accomplished practically and with uniformity.

Resolved, That a copy of these resolutions be sent by the secretary to the members of the Committee on Manufactures of the United States Senate and to the Secretary of Agriculture.